

2 Vol.

147

Very scarce well at 2/5

307

150



John Fothergill Esq.

John

B

A

T

P

Pri

1485 fff 6

The Whole A R T of
HUSBANDRY :
Or, The Way of
Managing and Improving
O F
LAND.

Being a full COLLECTION of what hath been
Writ, either by Ancient or Modern Authors :
With many Additions of New Experiments and
Improvements not treated of by any others.

AS ALSO,

An ACCOUNT of the particular Sorts of
Husbandry used in several Counties ; with Propo-
sals for its farther Improvement.

To which is added,

The Country-Man's Kalendar, what he is to do
every Month in the Year.

The FIRST VOLUME.

By J. MORTIMER, Esq; Fellow of the
Royal Society.

The Fourth Edition with Additions.

L O N D O N :

Printed by J. H. for R. Robinson at the Golden Lion, and
G. Mortlock at the Phoenix, in St. Paul's Church-
Yard. MDCCXVI.

by The Whole A R T of

Managing and Improving
Of The Way of



Being a full Collection of what has been
Written either by Ancient or Modern Authors
With many Additions of New Experiments and
Improvements not treated of by any others.

An Account of the particular Sorts of
Instruments used in several Countries; with Inspec-
tions for the further Improvement.

The Country-Man's Calendar; what he is to do
every Month in the Year.

By J. M. A. A. Esq. Fellow of the
Royal Society.

Printed and Sold by J. M. A. A. Esq.

Printed by J. M. A. A. Esq. at the Golden Lion, and
at the Press in St. Paul's Church-
Yard.

T O T H E
ROYAL SOCIETY.

I Know not to whom I can more properly address this Treatise than to that SOCIETY, to whose Encouragement, Inquiries and Directions it owes its Birth; especially since the Members thereof are the most capable Judges and greatest Encouragers of every thing that may contribute to the Service and general Good of Mankind, and have taken such Pains and Care to trace Nature out in all her Recesses, as to let no useful part of Knowledge escape their Observation and Consideration: Every one being obliged, in what Part

To the Royal Society.

soever of the World they are, to make faithful Records of the Works both of Nature and Art, for the detecting of specious and prevailing Errors, the restoring Truth to its Lustre, and the improving of it so as to clear the way to what Remains undiscovered.

I must here beg leave to acknowledge my Obligations to the Learned Dr. *Sloan* for his favourable Assistance and Incouragement of this Work; who, agreeable to the great Designs of this Honourable Society, has greatly contributed to the Advancement of useful Knowledge.

And tho' *Agriculture* is what some may have a slight Opinion of, yet 'tis one of those Arts, to the Teachers whereof Dr. *Sprat* (late Bishop of *Rochester*) says, the Ancients pay'd the Diviner Sort of Honour. And tho' the Zeal (as he says) by which they expressed their Gratitude to such

Bene

To the Royal Society.

Benefactors degenerated into Superstition; yet has it taught us, that a higher degree of Reputation is due to the Discoverers of profitable Arts, than to the Teachers of speculative Doctrines, or to Conquerors themselves. But I need say little either of the Antiquity or Usefulness of *Husbandry*, since so many Great and Learned Men have thought it worth their Study and Commendation, and that the Advantages of it reach all Parts and Persons in the World: So that there can be nothing more universally good, nor consequently better deserve your Honourable Protection.

As to what I here present you with upon this Subject, I shall only say, I have seen and perused the most approved Works both of Ancient and Modern Authors that treat of it, and have Collected what I thought material in them towards the improving of this Vulgar Art. I have also ob-

To the Royal Society.

served the Practice and Experiments of several diligent Husbandmen in most Countries, and have not only improved them, but added many useful Experiments of my own, which, having tried, I can therefore write upon surer Grounds than those, who, though they have writ more learnedly on the same Subject, yet being only contemplative Men, and having had but little or no Experience of their own, have often erred.

I have endeavoured, throughout the whole Book, to express my self in as few Words and plain a Stile as I could, for the Benefit of Vulgar Readers, the Culture of Lands being left almost intirely to their Management.

If it should fail of giving general Satisfaction, yet I hope it will at least furnish abler Pens with Materials for a more compleat Discourse. However,

To the Royal Society.

ever, such as it is, I freely submit it to
your Censure and Correction, and
do my self the Honour upon this Oc-
casion to declare that I am

Your most Humble and

Most Obedient Servant,

J. MORTIMER.

THE UNIVERSITY OF CHICAGO

OF THE EAST ASIAN LIBRARY

AND THE MUSEUM OF THE HISTORY OF ART

CHICAGO, ILLINOIS

1955

THE UNIVERSITY OF CHICAGO

OF THE EAST ASIAN LIBRARY

UNIVERSITY OF CHICAGO

THE CONTENTS.

BOOK I.

- Chap. I. **O***F Inclosing of Land:
With an Account of several sorts of Fences;
the manner of Planting and Plashing of
Hedges, the making of Ditches; and how
to order White Thorn, Black Thorn,
Crab, Holly, Elder, Alder, Furze, &c.*
à p. 1 ad p. 14
- II. *Of Pasture and Meadow Lands* *ibid.*
- § 1. *How to improve them by overflowing
and otherways* 17
- § 2, 3. *Of Boggy and Fenny Lands,
and how to drain and improve them* 21
- § 4. *Of*

The CONTENTS.

- § 4. Of Marshes near the Sea, and of
their Improvement 26
- § 5. Of Lands overflowed by the Sea,
with an account of Sea-banks, and
how to improve them, &c. 28
- III. Of the making of Hay 29
- IV. Of several sorts of Grass Seeds, as Clo-
ver, p. 32. St. Foin, p. 33. La Lu-
cern, p. 35. Rey-grass, p. 37. Tre-
foil, p. 39. Several other Grasses ibid.

BOOK II.

- Chap. I. Of Arable Land and Tillage 43
- II. Of Ploughs. Several Observations about
making them, and several Sorts proposed
for the Improvement of that useful Instru-
ment à p. 44 ad 51
- III. Of Plowing all sorts of Land, and or-
dering it for all sorts of Grain, and the
different Methods in several Counties 51
- IV. Of the laying of Land in Ridges, and
the sowing of it 57
- V. Of sowing of Corn 59
- VI. Of steeping of Corn 61

BOOK III.

- Chap. I. Of the several sorts of Soils, their
Natures, Products and Management 64
- II. General

The CONTENTS.

II. General Rules for ordering of Corn-Lands	66
III. Of the Natural Produce and way of ordering several sorts of Lands in several Countries, as Chalky, Sandy, Gravelly, Stony, Heathy, Moorish and Clay-grounds, of Black Mould, &c.	à p. 67 ad 78

BOOK IV.

Chap. I. Several ways of Manuring, Dunging and Soiling of Land, and what is best for each sort of Soil, with Observations about each sort of Manure	78
II. Of the burning of Land	79
III. Of Chalk	82
IV. Of Lime	84
V. Of Marle	87
VI. Of Fullers Earth	98
VII. Of Clay	99
VIII. Of Sand	100
IX. Of Earth	102
X. Of Sea Sand and Weed	103
XI. Of Dungs	113
XII. Of Sheeps-dung	115
XIII. Of Hogs-dung	116
XIV. Of Urine	117
XV. Of Humane Ordure	118
XVI. Of the Dung of Fowls	ibid.
XVII. Of several other Soils and Manures ; as Ashes, Soap-ashes, Soot, Rags, Malt-dust,	

The CONTENTS.

*dust, &c. and the several Soils each sort
of Manure is best for* 120

BOOK V.

*Of several sorts of Corn, Grain, &c. and
the Way and Manner of ordering of them,
with an account of what Soil is best for
each Sort, with Remarks on the particular
Ways (in several Counties) of managing*

Chap. I. Of Rye	125
II. Of Wheat	126
III. Of Barley	130
IV. Of Black Oates	134
V. Of White Oates	135
VI. Of Buck Wheat	136
VII. Of Pease	137
VIII. Of Beans, Vetches, Lentils, Tares, and other Pulse	139
IX. Of several ways of preserving of Corn, the making Granaries of several Sorts, with an account of some of the Foreign Granaries, and the best Way of ordering of each particular Grain for the preserving of them	141
X. Of thrashing and cleansing of Corn	151

Particular Observations on the Ways of
Ordering

Chap. XI. Of Hemp and Flax	152
XII. Of	

The CONTENTS:

XII. <i>Of Flax</i>	154
XIII. <i>Of Rape and Cole-seed</i>	155
XIV. <i>Of Turneps</i>	157
XV. <i>Of Madder</i>	160
XVI. <i>Of Woad</i>	163
XVII. <i>Of Weld, or Dyer's-weed,</i>	165
XVIII. <i>Of Liquorice</i>	166
XIX. <i>Of Saffron</i>	167
XX. <i>Of Hops</i>	170
XXI. <i>Of French Furze,</i>	200
XXII. <i>Of Carrots</i>	201
XXIII. <i>Of Teasels</i>	202
XXIV. <i>Of Caraway and Coriander seed</i>	202
XXV. <i>Of Anise-seed</i>	203

*With Remarks on each kind, and what
Soil they best thrive in.*

BOOK VI.

Chap. I. <i>Of several Sorts of Beasts, Fowls and Insects for the stocking of Land</i>	204
II. <i>Of Horses and Mares</i>	ib.
<i>Twenty experienced Receipts for the Cure of many Distempers in Horses à 211 ad 223</i>	
Ch. III. <i>Of Asses</i>	223
IV. <i>Of Mules</i>	224
V. <i>Of the Bull, Cow, Calf and Oxe</i>	227

Nine

The CONTENTS.

*Nine experienced Receipts for the Cure of
many of their Distempers à 236 ad 239*

VI. Of Sheep	239
VII. Of Goats	245
VIII. Of Swine	247
IX. Of Rabbits	252
X. Of Dogs	253
XI. The Way of ordering and managing of Fowls	255
XII. Of Geese	256
XIII. Of Ducks and other Water-fowl	258
XIV. Of Turkeys	259
XV. Of Pigeons	261
XVI. Of Swans	264
XVII. Of Peacocks	265
XVIII. Of Pheasants, Partridge, and Quail ib.	
XIX. Of Bees, how to manage and order them	266
XX. Of Silk-worms and how to order them	268
XXI. Of Fish-ponds, how to store, manage, and order them for each Sort of Fish, &c.	269

BOOK VII.

Chap. I. Of several things injurious to the
Husbandman, how to prevent the Preju-
dice that may accrue by them; as of Heats
and

The CONTENTS.

and Droughts, of too much Wet, High-Winds, Mildews, Blights, Smuttiness, &c.

297

The Cure of Lands prejudiced by Stones, Shrubs, Furze, Broom, Fern, Thistles, Bushes, Quitch-grass, Goose-grass, &c.

308

How to destroy Foxes, Badgers, Otters, Conies, Hares, Pole-cats, Weefels and Moles

313

II. *Of Mice and Rats*

319

III. *Of Kites, Hawks, and all other Sorts of Vermin*

320

BOOK VIII.

Chap. I. *Of the general Uses of Corn, Grain, Pulse, and other Seeds propagated by the Plough; as Wheat, Barly, Malt (and the several ways of making it)*

332

II. *Mr. Markham's Observations about the making of Malt*

337

III. *An Account of the Way of making of Malt at Derby, as describ'd in Mr. Houghton's Letters of Husbandry and Trade*

339

IV. *An Account of the Manner of making of Malt in Scotland, by Sir Rob. Murray*

347

V. *Some further Observations relating to Malt*

351

BOOK

The CONTENTS.

BOOK IX.

- Chap. I. Of several Sorts of Instruments,
Tools, and Engines necessary for the Hus-
bandmans use, 356
- II. An Account of some Experiments (in the
Transactions of the Royal Society) which
may serve for the Improvement of Carri-
ages, and consequently both of Husbandry
and Trade 358
- III. Of several Instruments used for digging
of Ground 363
- IV. Of several other Instruments necessary for
the Farmer 366

BOOK X.

- Chap. I. Of Building and Repairs 367
- A Scheme of the Proportion of Timber for
ordinary Buildings 379
- Of Carpenter's Bricklayer's and Plaisterer's
Work, &c. and the Prices, Costs and Char-
ges of several Sorts of Buildings, &c. 380
- II. Of Mills 386
- III. Of several sorts of Work belonging to
Husbandry, computed at the Price of Four-
teen-pence a Day in Summer, and Twelve-
in Winter 388
- IV. Of the Charges and Profit of Farming
391

The

2
6
e
h
i-
y
8
g
3
or
6

57
for
79
r's
ur-
80
36
to
ur-
ve-
88
ng
91
The



with
wee
and
cier
Def
the
Lan
vari
wha
V



The ART of
HUSBANDRY:

Or, the Way of improving of

LAND.

BOOK I.

Chap. I. *Of Inclosing of Land.*

THE great Improvements that have been made of late in *Husbandry*, and the small Collections that are extant of them, with the difficult Reception that these Improvements meet with, because of the Ignorance of some, and the wedded Opinions of the Generality to the Custom and Practice of their Neighbours, will be a sufficient Justification of this Undertaking: The Design of which is, *First*, to give an Account of the common Way and Method of Managing of Land, and the several ways of Ordering the various sorts of Grains: And, *Secondly*, To shew what new Improvements have been made, and

VOL. I. B what

what different Methods are used in most Places, and upon what sort of Land, with the Reasons of such Improvements, that so every one may be able to judge of their own Practices; and to see what Additions are necessary and most reasonable to be made use of for the Improvement of their Interest.

For Labour and Industry being the chief things to make Land valuable, it concerns the judicious Husbandman to consider the Nature of the Land he is to spend his Time, Cost and Labour upon, and whether it be fit for Meadow, Pasture, Corn, Orchard or Gardens; and likewise what sort of Beasts or other Animals 'tis best to stock it with, and what sort of Pulse, Trees, Fruits, &c. is best for each particular Soil: And likewise the particular Ways and several Methods used to improve and manage Land to the best advantage, with the Cost and Produce of it: Concerning all which Particulars, I shall endeavour to give as plain and distinct Directions as I can; and in order to it begin with the *Inclosing of Land*, as what lays a Foundation for Industry and good Husbandry; because of the Security it gives a Man in the quiet possessing the Benefit of his Labour and Care. I shall wave the Disputes that have been produced to prove the *Advantages* or *Disadvantages* of Inclosures and open Fields; because I think these two things alone sufficient to prove the Advantage of Inclosures, without making use of any other Arguments, *viz.* First, the great quantities of Ground daily Inclosed; and Secondly, the increase of Rent that is every where made by those who Inclose. And therefore the Method that I shall follow shall rather be to give an account of the several sorts of
Fences

Fences, the Customs and Usages about them, and the Manner and Way of propagating of them, with the Cost and Charges of their making, than to endeavour the Conviction of those that matter of Fact is not able to make sensible of their own Advantage.

I have already said a great deal of the advantage of *Inclosing of Land*, which I find to be the most neglected in the North of any part of *England*, where I think it a great Neglect in them; because it would be a much greater advantage to them than 'tis to those that live in the South, since they need more shelter, and to have their Land kept warmer than those that are in a warmer Climate.

If you *plash a Hedge*, and cannot conveniently Plow or Mow it; the first Year or two after 'tis plashed, feed it with Horses, and not with Cows or Oxen, who are more apt to crop it than Horses are.

Crab-stocks planted close together, like Quick, will make an excellent Hedge, and so will some sort of *Plumbs*.

The Root of an old *White Thorn* will make very fine Boxes and Combs, and many of them are very finely veined; so that if they were suffer'd to grow large, they would be of great use for the Cabinet-makers, as well as the Turners, and others.

Haws put in a Hair Bag, and soaked in Water all Winter, and sown in *February* or *March*, I am told, will come up the first Year, and grow better than any other way.

For Inclosing of Land the most usual way is with a Ditch and Bank set with Quick: In Marsh-Land, where is plenty of Water to fill them, they content themselves with Ditches a-

lone. In *Cornwal* and *Devonshire* they make as it were two Walls with flat Stones, laying of them one upon another, first two, and then one between, and as it rises, they fill the space with Earth, which binds it together, and so they continue the Stone-work, filling of it to what height and breadth they please, beating of the Stones in flat to the sides, which makes them lie very firm, and is the best Fence of any, where flat Stones are to be had, and what best secures the Ground and Cattle. Upon these Walls they plant Quick and Timber-Trees, which thrive exceedingly. In the North Country, and several other Places, where are abundance of flat Stones, they make Fences of them by laying of them one upon another like a Wall, and only lay the Top-stones in Clay to keep them together, the weight of which secures the under ones. For the Stone-Fences in the North, which they make about five Foot high, they dig the Stones for 18 *d.* a Rood, and make the Walls for the same Price, reckoning 21 Foot to the Rood or Pole. To dig the Stones for Fences, Buildings, or Lime in *Suffex*, they reckon 3 *s.* a Cart-load.

In Marshes where there are no Hedges they allow the Ditches to be six Foot wide, against Highways that are broad, and against Commons five Foot : But the common Ditches about Inclosures are three Foot wide at the top, one at the bottom, and two Foot deep, that so each side may have a slope, and not be upright, as they make them in many Places, which are always washing down. Besides, in a narrow-bottom'd Ditch, if Cattle get into it, they cannot stand to turn themselves to crop the Quick; but where the Ditch is four Foot wide,

wide, it should be two Foot and a half deep, and where 'tis five Foot broad, three Foot deep, and so on in proportion.

I shall begin with the *White Thorn*, as the *White Thorn*. best Quick to plant, and because 'tis the most common, and esteemed the handsomest and best Fence. It will suit any Soil, where a new Ditch and Bank is made, except the driest Gravel and Sand, and will often grow upon that too, if it prove a wet Year. 'Tis raised of Seed or Plants; but Plants are the quickest way, the Seeds lying two Years in the Ground before they spring; but they grow very fast after two or three Years. Where Sets are scarce, when you fell your Under-woods, or rather the Year before, sow Haws and Sloes in them, and they will furnish you without doing of your Wood any hurt, because you may draw them before they come to be big.

Next to the *White* is the *Black Thorn* and the *Black Thorn and Crab*. *Crab*, which make a very good Fence, and is raised as the *White Thorn*; only if you sow *Apple* or *Crab* Kernels, sow the Punmace with them, they will come up the first Year. *Black Thorn* is not reckoned so good for Fences as the *White*, because 'tis apt to run more into the Ground, and is not so certain of growing; but then the Bushes are much the best, and most lasting of any for dead Hedges, or to mend Gaps: Nor are Cattle so apt to crop them as the other. They will grow upon the same sort of Soil with the *White Thorn*; but the richer the Mould is, the better they will prosper.

Another good sort of Fence is the *Holly*, which were to be preferred before any other, were it not for its slow growth, and the difficulty that there is in getting of it to grow

at first : But afterwards it makes amends by its Thickness, Strength and Height. 'Tis raised by Sets or Berries, like *White Thorn*, and lies the same time in the ground before it comes up: It will grow upon the driest Gravel, or amongst Stones or Rocks; and it delights most in light Grounds. If you raise it by Plants, let them be about the Thickness of your Thumb. Plant them in a moist Season in Autumn or in Spring, and take particular care to shade them well with Hawm or Straw, and water them till they begin to sprout. If any of them seem to perish, cut them close to the Ground, and they will spring from the Roots. Keep Sheep from them, who are very desirous of cropping off the young Shoots; and dig about their Roots, which will very much help their growth; but by no means lay any Dung near them. The best way of planting them, is to mix them with the *White Thorn*, and to let every fourth or fifth Set be a *Holly*, by which means they thrive best, and afford a speedy Fence. As the *Holly* grows, you may pluck up the Quick, and if need be, increase the thickness of the *Holly* by laying of Layers from it. Some propose to take a well-rooted Set of a Yard long, and strip off the Leaves and Branches, which, cover'd with a competent depth of Earth, will send forth innumerable quantities of Suckers, and quickly make a Hedge. Field-Mice are apt to gnaw their Roots, and kill them in hard Winters.

Holly may likewise be raised of the Berries, which as they lie till the second Spring before they come up, may be ordered as hereafter is directed for Seeds of that kind; but as they are a hardy Plant, I think it best to sow them in
the

the place where you design them to grow, only you must mind to keep the place well-weeded before they come up, as well as afterwards. Mr. *Evelyn* says, the Seeds should be pick'd when they are ready to drop, and that the tenacious glutinous Mucilage that is on the out-sides of them should be rubbed, and washed off, which, he says, is of great advantage to cause them to take; and Mr. *Cook* says, they may be raised by Layers. The Timber bears a great price with the Cabinet-Makers, when large, for inlaying; it being the whitest of all hard Woods.

Where you have any thing of a good Soil, you may take *Elder* sticks or Truncheons ten or twelve Foot long, and stick in your Bank slope-wise each way, so as to make a Chequer-work; it will make the speediest Fence and the quickest Shelter for Gardens of any whatever. 'Tis a Wood very useful for Turners and Instrument-Makers, vying even with the best Box, and for many Uses surpassing of it.

Alder makes an extraordinary Fence against *Alder*. Rivers and Streams, and preserves the Banks from being undermined by the Water, because 'tis always sending Suckers from the lowest Roots, which makes it very useful, where Streams wear away the Banks, and are widening of their course.

Where there are old dry Banks, or such a *Furze*. dry sand or Gravel that nothing else will grow on't, the *Furze* is an extraordinary Fence. 'Tis raised by Sets or Seeds; but Seeds are the best way of raising of it, especially the *French Furze*, which grows to the height of fifteen or sixteen Foot; and is not subject to run into the Ground, or to spread like the common Sort: It will

make a Hedge in three Years time, if well-weeded, and carefully kept from Cattle, especially Sheep, who are great Devourers of it, till 'tis of some bigness, and then nothing can hurt it. If 'tis clipp'd, it will do very well, and be very thick: But if let grow at large, it will be the better shelter, and yield excellent Fuel: They make very great advantage by sowing of their Land with it in *Devonshire*; but of that more hereafter. In *France* they make Inclosures with it that they sow ten or twelve Yards thick, which makes a mighty shelter for Game. I am told that *Furze* (whether *French* or *English* I cannot say) will grow upon the Sand in Salt Water; if so, it will be a great advantage to those that have Walls or Banks next the Sea, to preserve them.

Planting.

In Planting of Quick you are to consider the Nature of the several sorts of Land you design to plant it in, as whether it be Clay, Sand, Gravel, &c. and what sorts of Plants will best agree with each sort of Soil, and likewise the Soil you have your Plants from, and whether they are raised upon worse Land than you design to plant them in, or else it will be more difficult to get them to grow well, and likewise the manner of planting of them: But as the same Method is used in planting of one sort of Quick as is with all the rest, (except only in what I have already instanced) so I shall describe only that of the *White Thorn*, as being the common sort that is most used.

For the Sets let them be about the bigness of your Thumb, and cut within four or five Inches of the Ground; and if you design your Quick only for a Hedge, without a Bank or Ditch, let them be set almost perpendicular
in

in two Rows, at about twelve Inches distance from each other : but if you make a Ditch and Bank, mark your Ditch out the breadth mentioned before with a Line, and on that side you intend to make your Bank, lay the Turf with the Grass-side downward, upon which lay some of your best Mould to bed your Quick in, and lay your Quick upon it, so as the end of it may be inclining upwards, laying them about twelve Inches asunder; and be careful to procure those that are fresh gather'd, strait, smooth, and well-rooted; adding now and then at equal distances of about thirty Foot, a young Oak, Ash, Elm or Crab, to grow up with the Quick. When the first Row of Quick is laid, cover it with more good Mould, and lay a Turf upon it as before, and some Mould upon the Turf, so as that when your Bank is about a Foot higher, you may against the spaces of the lower Quick lay another Row of Sets, which cover as you did the former, and top the Bank with the bottom of the Ditch, upon which set the dry or dead Hedge to defend and shade the under Plantation. The Stakes are drove into the loose Earth at two Foot and a half distance, so low as to reach the firm Ground. Oak-stakes are reckon'd the best, and Black Thorn and Sallow next; let the small Bushes be laid below, but not too thick, only a little to cover the Quick from the biting of Cattle when it springs, and the long Bushes at the top to bind the Stakes in with by interweaving of them; and to add a farther strength to the Hedge you may edder it, as they call it, which is to bind the top of the Stakes in with some small long Poles or Sticks on each side; and when the eddering

is

is done, let the Stakes be new drove, because the waving of the Hedge, and the eddering are apt to loosen the Stakes.

Your Quick must be constantly weeded, and carefully kept from Cattle, especially Sheep; and if you do not find it shoot well, or that it should happen to be cropped with Cattle, cut it in *February* within an inch of the Ground: This will cause it to strike fresh Root, and often help it much in its growth.

*Hedges to
plash.*

When your Hedges are about eight or nine Years growth, about *October*, or (which is better) in *February*, plash them; but as the plashing of an old Hedge hath some particular things belonging to it that are not in a new, I shall suppose the Hedge to be of twenty or thirty Years growth, and that there are old Stubs in it as well as young Shoots, which old Stubs must be cut sloping off within two or three Inches of the Ground, and as near as you can the best and the longest of the middle-siz'd Shoots left to lay down; some of the strongest of which may at five or six Foot distance be left at the height you intend the Hedge instead of Stakes; and where such Stakes are wanting, you must supply their Room with Stakes of other Wood. When you have thinned your Hedge, so as to leave on the Stubs only those Shoots that you design to use, that you have room to put a Spade through them, begin and cleanse your Ditch; keeping each side sloping as in a new Ditch; and where you find your old Bank hollow, or that the Earth is washed from the Roots of the Quick, face it (as they call it) with so much of the first spit of Earth, that you dig out of the Ditch, as you need; the rest, with what you dig out at
the

the second spit, lay upon the top of the Bank, which you must carefully see that the Workmen do: For it being more Labour, they commonly lay as much as they can upon the side or face of the Bank, the weight of which when wet comes, commonly makes it slip into the Ditch again, and often brings a great part of the Bank with it; whereas what is laid upon the top every time heightens the Bank, and makes any indifferent Hedge a strong Fence. In the plashing of your Quick avoid two extremes, first the laying of it too low, and too thick, which makes the Sap run all into the Shoots, and leaves the Plashes without Nourishment, which with the Thickness of the Hedge kills them: Secondly, avoid the laying of them too high, as is commonly used in the North, which draws all the Sap into the Plashes, and so makes but small Shoots at the bottom, and by that means makes the Hedge so thin, that it neither preserves it self from the Cattles cropping, nor prevents their going through: For which reason I prefer the middle way used in *Hertfordshire*, where are the best Hedges I have seen in *England*. When you have bent your Shoot that you design to plash, give it a small cut with your Bill half way through, something aslope downwards, and then weave it about your Stakes, trimming off the small superfluous Branches on each side of the Hedge that straggle too far out. And if for the first Year or two you can plow or mow the Field where you make a new Hedge, it will give the better opportunity for the Hedge to grow and thicken; but where the Stubs are very old, 'tis best to cut them quite down, and to secure them with good dead Hedges on both sides, till the
young

young Shoots get up tall enough to plash, and in the void places plant new Sets. If you plash a Hedge, and cannot conveniently plow or mow it the first Year or two after 'tis plashed, feed it with Horses, and not with Cows or Oxen, who are more apt to crop it than Horses are.

*Bank-
Fences.*

But the best Fence, and, I believe, the cheapest, considering the lastingness and goodness of it, where flat Stones are not to be had, is in a grassy place to dig some Turf, a Spit, or near a Spit deep, the breadth of your Spade, and about four or five Inches thick; lay these Turfs with the Grass outward, even by a Line on one side, and on the back side of these lay another Row of Turf, leaving a Foot-space of solid Ground on the outside to prevent the Bank from slipping in, if the Ground should any way be faulty; on the outside of which you may make a Ditch of what depth or breadth you please, or you may lower the Ground on each side with a small slope two Foot deep, and then you will have no loss of Pasture by the Fence, because it will bear Grass on both sides, and with the Earth that comes out of the Ditches or the sloped places fill the middle of the Bank level with the Turf on each side, and then lay two more Rows of Turf upon the first, and fill it again as before. This do till your Bank be four Foot high, or of what height you please, only your Foundation must be something broader, if you make it higher; and you must observe on each side to give a small slope to the Bank, so as to make the top about three Foot wide, upon which plant your Quick, making on the top a little hollow to keep as much of the Rain to the Quick as you can, and plant your

your Quick about a Foot or more in depth; by this means you will have a Fence six Foot high, besides the Hedge on it, which will (except in a very dry time) be always green on both sides like a green Wall, and make not only a pleasant Fence, but what will keep all sorts of Cattle within their Bounds, and the Quick that you plant upon it will grow much better than if planted any other way; and if any die (which it will hardly do) you may renew it when you will, or fill the spaces by Layers from those that do grow, and the Roots of the Grass will bind the Turf so together, that in one Years time it will entirely become solid, that you cannot see the Joints, nor get one of the Turf out, and it will be much stronger when the Roots of the Quick come to bind it together too; only you must take care that on or near the top at the first making of it, on each side to set a small Hedge of about a Foot high to prevent the Sheep from running up it, and that you do not make it when the Earth is too dry; because if a great deal of wet should suddenly follow, it will cause the Earth to swell too much, and by that means may somewhat indanger the falling of some of the outside, though I have made a great deal of this sort of fencing without having any of it fall: If it should, 'tis easily repaired. This Fence in good digging Ground, where Men work for Fourteenpence a day, may be made and planted with Quick for two Shillings a Pole; but if you design it a Fence to keep in Deer, at every eight or ten Foot distance set a Post with a Mortice in it to stand a little sloping over the side of the Bank about two Foot high; and into the Mortices put a Rail, which a Bough of

of a Tree or any thing will make ; and no Deer will go over it, nor can they creep thro' it, as they do often, when a Pale tumbles down. The Quick on this Bank you may keep clipped, which will make it a fine Fence, and 'tis one of the best Fences to afford shelter for Cattle.

Having shown you how to inclose Land, I shall in the next place consider the several sorts and kinds of it, as they may be proper either for *Grazing, Corn or Planting*, and begin with Pastures and Meadows.

Chap. II. *Of Pasture and Meadow-Land.*

Pastures and Meadows are of such advantage to Husbandry, that many prefer them to Corn-Lands; because of the small Hazard, Charge and Toil that attends them, and as they lay the Foundation of most of the Profit that can be expected from the Arable, because of the Manure the Cattle afford : So where Dung is not to be bought, or other Manure to be had, there ought to be a Proportion taken care of between the Pasture-Lands and the Arable, that so such a quantity of Dung may be raised as may be necessary for the Arable; or else the Arable-Land must be proportioned to the quantity of Dung that is raised from the Pasture, because proper Manure is the chief advantage of Arable-Ground.

Now all Feeding or Pasture-Lands are of three sorts: *First*, Up-land, that is, such as lies so high as not to be over-flowed with Rivers or Land-Floods; *Secondly*, Those Lands that

that lie near Rivers or Fens: And, *Thirdly*, Those that lie near the Sea.

First, *Up-lands*, that lie either upon the tops *Up-Land.* or sides of Hills or Rising-grounds, and consist either of Sand, Gravel, Chalk, Rock or Stone, Hazelly, Loam, Clay, or black Mould, and are best for Grazing or Corn, according as they lie moist or dry; which depends much upon their Situation and Nature: Those Lands that lie upon the tops of Hills, and that lie flat, are commonly the driest; and those upon the sides the moistest; because of the Moisture that continually is ouzing out of them: And so likewise the Chalky and Clay Lands are most apt to be moist, especially in Winter; because they retain the Moisture a long time, though they have also the inconveniencies of the Sand, Gravel, Rocky and Stony Lands, to burn in hot Weather, to chap in Summer, and poach in Winter. The black Mould and some of the hazelly Loams are the best for Grass and Corn too, especially if the latter is not subject to Worms; because they neither chap, poach nor burn. Too much or too little Water is almost equally prejudicial to Meadows, but the best Lands for Meadows or Pasture are either low Lands, or hanging Grounds, or any rich Soil that hath a moist bottom, especially where any thing of a little Brook or some running Spring may be brought over it, and where there is some descent in the Meadow, that the Water may not lodge on it: These Meadows are much better than those by great Rivers, where Crops are often lost. The worst of Up-land Meadows is, that they often need mending or feeding, which the other never do; but then the

the Hay of the former is much finer than that of the low Lands.

As the Improvement of these Lands is the same with that of the Arable ; so I shall defer treating of them till I come to treat of the Improvement of Corn Lands: Only you must note, that as the Dung that is laid on Arable Ground is harrow'd in with Harrows ; so that Dung that is laid on Pasture should be well harrow'd in with a great Bush, or with a Gate stuck full of Bushes ; and that all Dung that is laid on Pasture Land, must be done in Winter, that the Rain may wash the Fatness of it into the Roots of the Grass before the Sun dries it away. Many commend something of Mould mixed with Dung to be better than Dung alone, because it washeth better to the Roots of the Grass, and incorporates with the Earth: But the best Manure for Meadows is the bottom of Hay-mows and Hay-stacks, because of the Mould 'tis composed of, and the Hay-Seed that 'tis mixed with, which will both mend the Land and increase the Grass ; for which reason due care ought to be taken not to mix any Hay-Seed with the Dunghills that you design for Corn Ground, because 'tis apt to breed Grass and Weeds on them.

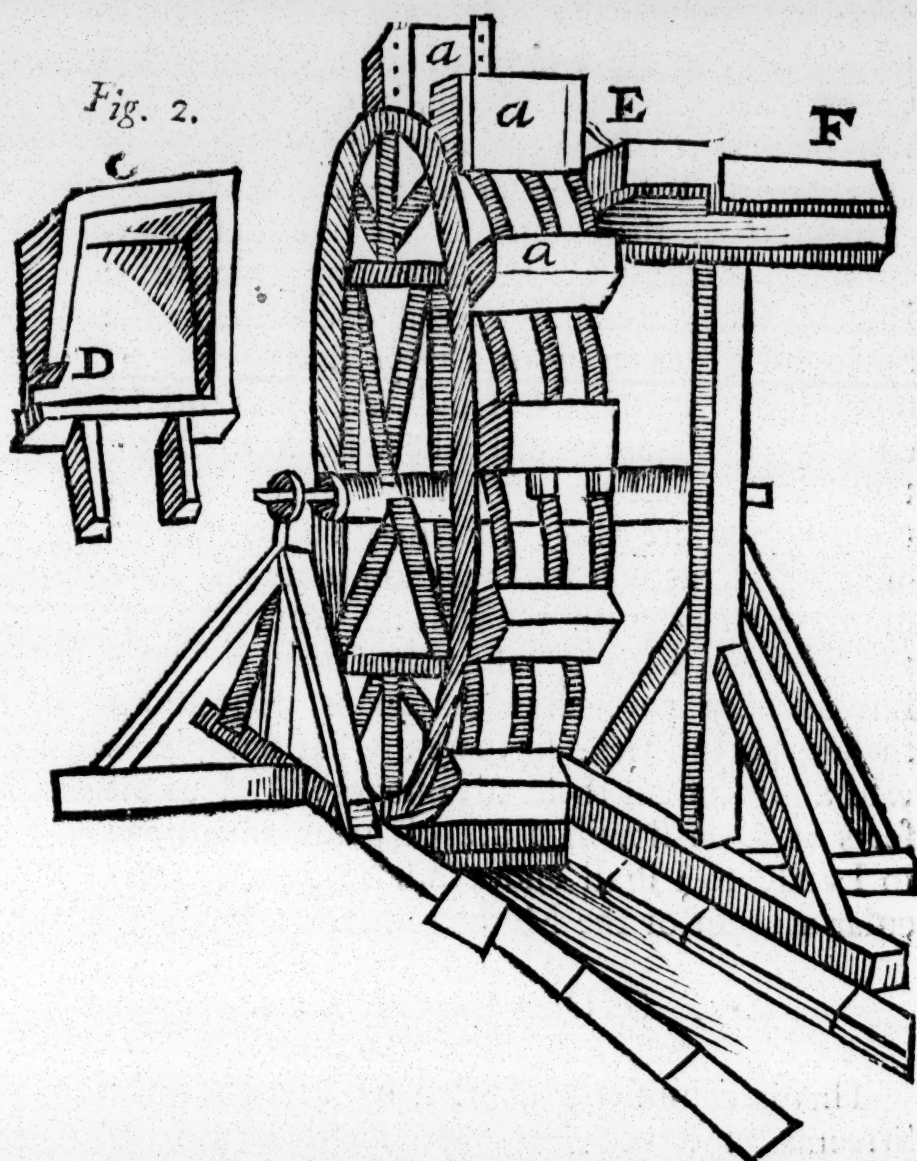
*Marsh-
Lands.*

A second sort of grazing Ground is that which lies near Rivers or Fens: As to Lands lying near Rivers, the great Improvement of them is their over-flowing, which brings the Soil of the Uplands upon them, so that they need no other mending, tho' constantly mow'd. The great inconveniency of these Lands is their being subject to Summer Floods ; which high Hills near the sides of the Rivers, and the long Course of them bespeaks to be frequent ; and
though

though near such Rivers is commonly the richest Land, yet there is the most danger of the Crops being spoiled, especially where they are not inclosed, that they may be fed with Cattle; which I think much the safest way of managing of these uncertain Lands, especially when feeding Cattle bears any thing of a Price. Where Meadows are flooded late in the Spring, roll them with a large Barley Roller, and it will mend the Grass, and prevent the damage such Hay would otherwise do to Cattle that eat it. But the most advantageous sort of these Lands are those that may be overflowed or laid dry, as you find occasion, that you may improve them with the Winter, and keep out the Summer Floods, when the Grass is long: But as only particular Situations will afford these opportunities; so there are but few places will allow of all these advantages: And as all sorts of Over-flowings are of great advantage to Land, so I shall endeavour to give a particular account of the Method of it.

§. I. *Of Over-flowing of Land.*

This is commonly effected by diverting the Streams of Rivers, Brooks, Land Floods or Springs, or some part of them, out of their natural Channel: But where the Streams lie so low as to be incapable of over-flowing the Lands, they are made use of to turn such Engines as may raise a quantity of Water to do it: The best and cheapest Engine for the effecting of which is the *Persian Wheel*, which may be made of what bigness you please, according to what height you would have the Water raised, and the strength of the stream that turns it.



At *a a a*, &c. are several Boxes set round the Wheel that turns it, and raises the Water ; at *Fig. 2.* is a particular Description of the Boxes as open, the flat side of which is turned against the Stream ; *C* shews the side that dips the Water ; and at *D* is the place where the Water runs out when the Wheel comes to the height of *E*, at which place is a Trough at *F* to carry the Water off ; and where Streams are not to be had, the Wind is made use of for the same purposes

purposes to work Pumps and other Engines: But as Lands near unto or bordering upon Brooks or small Rivers admit of greater Falls and Descents, than bigger Rivers do, which commonly run more flow and level; so they do often give opportunity for these Improvements, whereas the other doth it very rarely; but when it can be effected, large Streams make the richest Lands, because the large Rivers are usually the fruitfulest (as I said before.)

When you have got your Water up to the highest part of the Land that you can bring it to, make a small Trench to carry some of the Water in, to give you the level of the Land, keeping it always as much as you can upon a level, or upon the highest part of the Land, that so from the upper part you may be able to water the lower when you will; and by carrying of the Level of this small Trench you will be directed how to cut out your main Trench; which ought to be made big enough to receive the whole Stream that you raise, and to be rather broad than deep. At convenient distances, according unto the bigness of the Stream, and the quantity of the Land you are to water, make several small Trenches, making your main Trench the narrower, proportionable to the number of Drains you lead from it; only you must note that the greatest advantage of over-flowing is, where you can do it frequently, and draw it off quickly; because where Water stands long on Ground, especially in Winter, 'tis apt to breed Rushes and Weeds; and therefore where any such Inconveniency is, draw it off by small Trenches.

Oyster-weeds laid in breaches made in Banks by the Sea, and a layer of Earth put on it, and

then a layer of Weeds and Earth again; and so on, are very good to stop out the Sea: For the Weeds will grow and bind the Earth together; and I suppose such other Weeds as will grow in Salt Water, may be found to be of use for this purpose, especially if suited to the Soil that is near at hand, to stop the breach.

At the latter end of the Year eat up the Grass on the low wet Lands first, and then that on the dry warm Lands.

*Times of
overflow-
ing.*

Some graze their Land till *Christmas*, and some longer; but as soon as 'tis fed bare, from *Allhallowtide* to Spring, that the Grass is not too high, is the best time for overflowing, except it prove a dry time in *April* or *May*: If it do, it will be of mighty advantage; for in hot Weather the Grass grows three times as fast, if moistned, as at other times. Land-floods are best to overflow with in Winter, and Warm fatning Springs in Summer; only you must observe to let the Water dry in before you water it again, and not to let Cattle poach it; and that you water it at Night so as the Water may be gone before the heat of the Day comes, which is apt to occasion the scorching of it, and to rot the Roots of the Grass by lying too long on the Land. The washings of Highways, of Towns, or Streets, especially of Commons, where Sheep feed, is a very great Improvement of Land or Trees.

*Barren
Springs.*

In some places are Springs whose Waters are injurious to Land, as such usually are that flow from Coal-Mines, or any sulphureous Mineral, because they are of such a brackish, harsh Quality, that they kill Vegetables, instead of nourishing of them; as too much Salt, Urine, or Dung will do, if not applied in due quantity.

Yet

Yet I cannot but think that even these Waters would make a great Improvement, if sparingly used, and in wet times, that a great quantity of other Waters might mix with them. These Waters are commonly of a reddish Colour, and leave a reddish Sediment where they run, and are much better when they have run some distance, than at their first breaking out.

Also some sorts of Lands will not be improved by watering, except with Land-floods, and in Summer, when 'tis a very dry time, as your cold Clay, and strong Lands that lie very flat, partly because of their cold Nature, and partly because of their Flatness, and because Water will not easily penetrate stiff Clay; and therefore light dry warm Grounds are the most improved by watering; but as some Lands are improved by overflowing, so the chief Improvement of others is by draining; as,

Some Lands not improved by watering.

§ 2. *Boggy Lands, and Lands lying near Fens.*

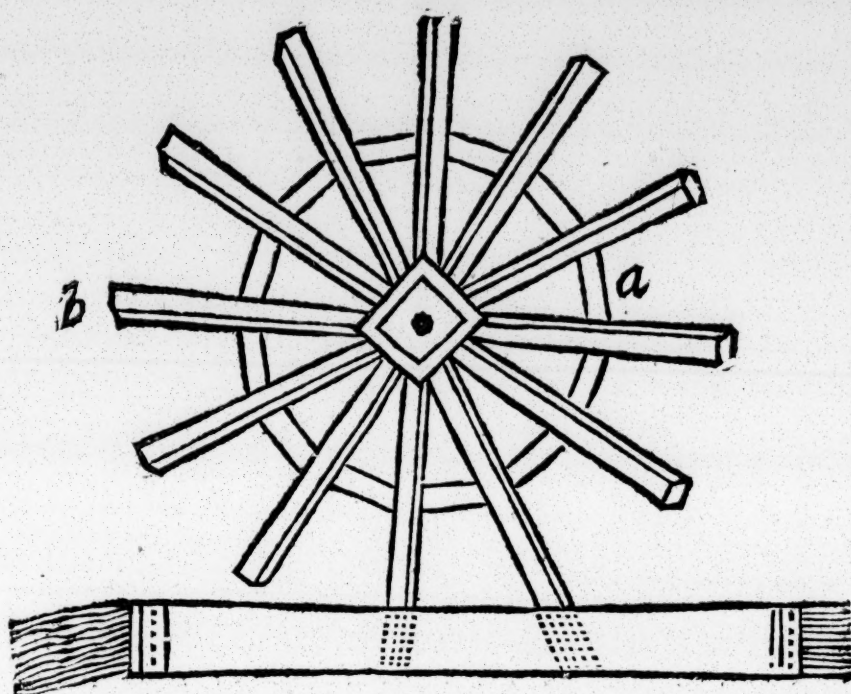
Boggy Lands are of two sorts: *First*, Those that lie between Hills, which commonly have descent enough to drain them. *Secondly*, Those which lie in flat Levels and Fens; but these being part of the Fens, I shall defer the Description of them till I come to treat of Fenny Lands. Boggy Lands are fed by Springs pent by a weight of Earth that dams in the Water, and causes it to spread in the Ground so far as the Earth is soft. Therefore you must observe where your lowest place is, and what descent you have, that so you may cut through the Earth deep enough to take all the Water away from the bottom of the Bogg, a Spit below the Springs, or else your Work will be but of little value.

value. In rushy Grounds the Springs are most commonly found at the first or second Spit, where any thing of small Gravel or Stonyness is to be found, and sometimes lower in a hungry Gravel: But tis always lower in boggy Land than rushy, and is deep according to the weight of Earth that pens it in. The best way is to begin the Drain at the lowest place, and so to carry it into the Bogg towards the Spring-head, where you must make such Trenches either round cross the Bogg as you shall find necessary to drain it throughly. If your Drains be deep, that you fear Cattle falling into them, fling in Stones and Brick-bats, and cover them with Wood, Flags, Turf, &c. laying the Earth upon it again, and the Water will drain between the Stones: But whatsoever Drains or Trenches you make that you leave open, never lay your Earth on heaps by the sides of them as most do; but let the Earth be flung as far from it as you can, or spread in low places that are near, if your Trenches are small: But where large, and the Work is not too great, carry it away in Wheel-barrows or Carts, where the Ground will allow of it.

§ 3. *Of Fenny Lands.*

Fenny Lands are of two sorts: *First*, Those that are only drowned by Up-land Floods and great Rains, and are very large, and upon great Levels, that the Water cannot run off from them till the dry Weather helps to dry it up: *Secondly*, Those that are constantly wet, only in dry times they are shallower than in wet. Now in draining of either of these sorts of Lands you must consider two things, *First*,
The

The laying of them perfectly dry, which can only be effected by the way before proposed for the draining of boggy Land : Or, *Secondly*, Only the taking off from them the Land-floods, Rains, &c. that fall on them : The one makes a perfect Cure, and the other only makes the Land serviceable in dry times, and leaves the less Water for the Sun to dry up. And therefore you must consider the lowest part of the Land, and take care to carry off the Land-floods and Streams that way, before you attempt any thing of a through draining, lest your After-cost and Labour prove unsuccessful : Which point if you can gain, make your main Drains wide and deep enough to carry off the Water from the whole Level, and as strait as you can, carrying all your small Drains into the middle Drain, which is the main of the Work ; always observing to keep your Drains largest at the Mouth, and to narrow it by degrees, as they run more up into the Lands : These Drains should always be kept cleansed in Spring and Autumn from Mud, Weeds, &c. And though the Land-floods are a great Improvement of any Land where a vent can be had for them ; yet where you cannot have it, because of the Waters meeting with a full stop, so that it must be raised with artificial Engines ; the best way is to turn all the Water you can from it, and to meet the Land-floods upon the higher Grounds, where they may be taken so as to be carried into Rivers and Channels that lie higher than the Level of the Fens, that so you may have the less Water to raise with Engines ; the best sort for which purpose that I have yet met with (this being a particular that I should be glad of having more intelligence a-



bout from any that will be so kind as to send any such thing to the Publishers) for the draining of Lands is the foregoing Wheel, much used in *Lincolnshire* to drain the Fens, which is turned with large Windmill Sails, and are made proportionable to the strength that is to turn them. 'Tis a vast quantity of Water that their turning will row along upon a flat, where the Water is not to be raised any height, the Spoaks being made broad, and set a little sloping, the better to row the Water, as you may see in the Figure, which Spoaks are exactly fitted to move between two Boards; but when they are to raise the Water any small height above the Level, the Spoaks are made hollow like Scoops, and set so as to deliver the Water at that height; but if the place requires the casting of it over a Bank that is of any great height, the end of the Spoaks are made like Boxes; which as the

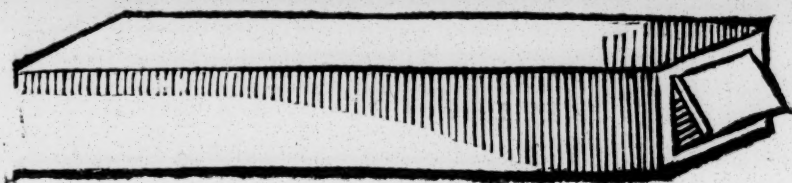
Wheel

Wheel rises lets the Water run into the Circle at *a*, which is made hollow to receive it: And a Channel being made on the Back of the Spoaks delivers the Water at *b*, as the Wheel descends.

If any Dryness appear on the Surface of the Levels, and that there are Springs left, search for them, and when you have found them, order them after the same manner, as you were to order the boggy Land; but if any small Hollownesses remain that do not dry, you need not trouble your self about them, if there be no Springs in them that may cause their overflowing in Winter.

They have a very good way in *Essex* of draining of Lands that lie below the High-water, and that are something above the Low-water-mark; that have Land-floods or fleets running through them, which make a kind of a small Creek. These Lands when they first inclose them from the Sea, they do it with a Bank, which they make from one side of the Land they design to take in, to the other, except a space that they leave, where the Creek or Land-floods run into the Sea: This when they begin to stop, they do at once with a strong firm Head; only according to the quantity of the Water that they have to vent, they lay in it several square Troughs, which are composed of four large Planks of the same length that they design the Thickness of the Head to be, and towards the Sea is fitted a small Door which opens when the fresh Water bears upon it, and shuts when the salt Water rises, as may be seen in the following Figure, that End where the Door is being put next the salt Water. These Marshes are commonly very good Land, and furnish Cattle with good Water; which

is



is a thing much wanting so near the Sea, where these Marshes commonly lie.

Mills are in many places a very great prejudice to Land near Rivers, by damming up of the Waters, and by keeping them continually wet. Where you have any such inconveniency, though you cannot draw the Water down because you are not owner of the Mill; yet you may at some distance from the River make drains to carry off the cold Water that prejudices the Roots of the Grass, into some place of the River below the Mill, which will be but a small Charge; and will much help your Land from being chill'd with the continual Coldness of the Water.

§ 4. *Of Marshes near the Sea.*

A third sort of grazing Ground is that near the Sea, which is commonly very rich Land. But as these Lands commonly lie very flat, 'tis necessary to keep all the Water you can from coming upon them; especially that of the Sea, which is many times done at great Charges, according to the length, breadth and height of the Walls, which must be proportionable to their being exposed to the Waves of the main Sea, or of a broad or narrow Creek or River, and of the Rise of the Tide. Two main things that are commonly wanting in these Lands are good Water and good Shelter; which may be helped

helped in many places by making of good Ponds to hold the Rain-water, and by planting of Trees and Hedges, which in most places would be of great Advantage to the Grass to shelter it from the Sea-breezes; which often in these Lands, in the Spring, will cut off the tops of the Grass, as if mowed, especially in the Northern Parts. These Lands fat Cattle the soonest of any, and preserve Sheep from the Rot: But they would be much better for all sorts of Cattle than they are, if they were better shelter'd; and where they cannot be inclosed round, if in the middle of the Marshes, Banks were cast up in Form of a Cross, or in the Form of two half Circles, that they might be a shelter for Cattle, let the Wind blow which way it will, and planted with Hedges and Trees for Cattle to get behind in stormy Weather, it would be a great advantage to them. But tho' too much salt Water may prejudice these Lands, yet I heard of one who had some Marsh Land, that when the Sea Water was very thick, would open some Sluices he had made on purpose, and let the Sea Water on upon his Land, which he let stand on it till it settled; and by this means he very much improved it.

Upon the Sea-coast are a great many parcels of Land that would pay well for the taking in, as about *Boston*, *Spalden*, and other parts of *Lincolnshire*, where the Sea falls off from the Land; so as that upon the outside of the Sea-walls on the *Ouse* (though every Tide covers it with salt Water) grows a great deal of Grass, and the *Ouse* is firm to ride on, even when the Water is upon it. This *Ouse* when taken in, hardly sinks any thing at all, and they dig the Earth for the Walls on the outside of it, which
the

the Sea in a few Tides fills up again; and tho' the Sea at High-water comes but to the Foot of the Bank, yet once in a Year or two some extraordinary Tides go over the Banks, though they are ten Foot high, fifty foot broad at the bottom, and three at the top: For the making of these Banks they give twenty six Shillings a Pole, the Earth being all carried in Wheel-barrows, and the Face of the Bank next the Sea turfed, on which side is the chief Slope. Whereas in *Essex* about *Malden*, &c. the *Omse* is like Mud, and so soft, that you can hardly tread on it, bearing nothing but a few Weeds; and if they dig any thing of a hole in the *Omse* on the outside of the Bank, if 'tis any thing near, the Sea will enlarge it so as to undermine their Walls: For which reason they take all the Earth that they make their Walls with from the Inside; and though the Tide commonly comes up to the Foot of the Bank, yet they keep out the Spring Tides there with a Wall of four Foot high, three Foot broad at the top, and ten or twelve Foot at the bottom; which Walls they have made for four Shillings a Pole. This sort of *Omse* when it comes to be inclosed, sinks three Foot deep. One Acre of these Lands I have observed not to be in proportion to the distance each are from *London*, of above half the Value that those are that are gained from the Sea in *Lincolnshire*.

§ 5. Of Lands overflowed by Sea-Breaches.

Though Salt moderately used is a very great Improvement of fresh Lands, yet too much kills all sorts of Vegetables. Therefore as soon as your Breaches are stopped, make Trenches, and draw

draw the Salt-water off, as soon as you can into some low place ; where by an Engine or other-ways you may cast it over the Bank into the Sea, or into some waste Ground, except 'tis so small a quantity as the Sun will soon dry up ; and lay as much fresh Earth or Mould upon it as you can to abate the Saltness of the Earth, plowing of it also three or four Years to let the Rains and Air into the Land to freshen it ; and you'll find it a great help to it.

As to what relates farther to the overflowing of Land, making of Drains, Sea-walls, with an Account of particular Engines for such Works, with the Cost and Charges, and the Nature of the Land taken in, &c. if any that are willing to incourage this Work will communicate them to the Publishers, they shall be added either with mentioning of their Names that send them, or not, as desired, and be inserted as Additions to the Appendix ; that so against the publishing of it, I may be able to give the fuller Account of these Particulars.

All these sorts of grazing Grounds are commonly stocked the best with the largest Oxen, Cows, and Sheep ; the middle sort with a lesser Size ; and the more barren with Sheep alone ; the rocky with Goats, and the worst with Rabbits : For nothing is of greater prejudice to the Farmer than the stocking of his Land with Cattle, that are larger than it will bear.

Chap. III. *Of the making of Hay.*

WHAT Up-lands you design for mowing, shut up the beginning of *February* ; but your low Meadows and Marsh Lands you need

need not lay up till *April*, except the Spring be very wet, and your Marshes very poachy. Many feed them till the first of *May*, especially those that are in danger of overflowing. In Spring let all the Sticks, Stones, and other Trumpery, be picked up, and the Mole-casts spread, because they will else hinder the Mowers : And if your Meadows lie any thing uneven, or have been poached in Winter, rowl them with a large wooden Roller ; then the Mowers will be able to cut much the closer, and the quantity of Hay will answer the Trouble.

For the time of mowing of Grass, it must be according to the Growth or Ripeness of it : Nothing is more prejudicial to your Crop than mowing of it too soon, because the Sap is not fully come out of the Root ; and when 'tis dry, it shrinks away to nothing : nor yet to let it stand too long, till it have shed its Seed, and that all the Sap is dried up, which only is the nourishing part of it for Cattle ; and therefore to know when Grass is fit to cut, look carefully upon it, and when you see the top thereof look brown, and begin to bend the Heads, and that the red Honey-suckle Flower begins to wither, which will commonly be about the middle or latter end of *June*, you may conclude it ripe. As soon as your Grass is mown, if there is plenty of it, that it lie thick in the swath, so as that neither the Air nor Sun can pass freely through it, cause your Hay-makers to follow the Mowers, and to cast it abroad (except you fear wet ; if you do, let it lie upon the swath) this they call *Tedding* of it. At Night make it into Grass Cocks, the next Day as soon as the Dew is off the Ground, spread it again, and turn it, that it may wither on the other side

then handle it, and if you find it dry, make it up into Cocks. Next Day spread it again, and draw it into long Rows, which they call Winrows, which is a convenient way to dry the Hay, and makes it easie to get together again, in case of Rain, to make up into large Cocks which will secure it from wet, though you let them stand a Day or two. Be sure, before you carry your large Cocks in, to open them once, and to spread them in the Sun, because 'tis apt to give in the Cock; and if any Rain happen to fall on your Hay, do not turn it till the upper side be dry: For to turn the wet Grass to the moist Earth is the readiest way to rot it; neither open any of the Cocks, till the outside of them is dry. Where thick-leav'd Weeds are amongst the Grass, they will need more drying than ordinary Grass doth; and when you have good Weather, put in all the hands you can, that you may observe the old saying of making Hay when the Sun shines.

Mowing of Land too often and too long is a very great Prejudice to it, except it be Land that is constantly mended with Water-Floods: and therefore where you have not that Convenience once in three Years, or every other Year, feed your mowing Lands, if you cannot get Manure constantly to keep them in heart. For feeding is as necessary for Hay-ground, as fallowing is for Corn-grounds. I shall not say any thing of After-crops, because I think them neither good for the Land, nor yet the Hay good for Cattle. In *Oxfordshire* they have Rolls made with Steel Edges, which as they go round cut the Turf to such a breadth, as the edge of the ledges stand distant from each other: So that first drawing of it one way, and then cross,

cross, it cuts the Turf into even Squares; that you have no more trouble but to pare it with a Paring-shovel, and it will fit any place you design it for.

Chap. IV. *Of several sorts of Grass-seeds.*

I Shall not say much for the recommending of these Grasses, because most by experience know their Profit; but only teach you to manage them, and then describe their several kinds.

In sowing of all sorts of Grass-seed, let your Land be plowed more than once, to kill the natural Grass and Weeds, which else are apt to choak them; and they must be sowed after the Corn that you sow with them, so as to harrow the Land but once over after 'tis sown, which is best done with a Bush or a Gate stuck with Bushes.

§ 1. *Of Clover-Grass.*

Clover-Grass.

Of the several sorts of these kinds of Seeds, that which the Precedency is commonly given to, is the *Clover Grass*, for the great Improvement it makes upon Land, the Goodness of its Hay, and the Profit of its Seed, which most Authors give a very great Account of the Advantage of: But as they are silent about the Nature of the Land, that these great Improvements have been made upon, and of the particular way of ordering of such Lands; so their Accounts are very short in respect to the particular Application that might else have been made to Lands of the same kind: But the great Advantage of Clover is, that it improves
Land

Land by the great quantity of Cattle it maintains, and fits it for Corn again in two or three Years time, it being one of the best ways of improving most sorts of Lands, especially Clays, where Manure is scarce, and therefore much used in *Sussex* and other Clay Countries.

Clover is of several sorts; the great Clover *Sorts.* is reckoned the best, whose Seed is like that of Mustard, except in that it is rather oblong than round; the choicest of which is that of a greenish yellow Colour, some of it a little reddish; but the black is not so good. Our *English* Seed is the best.

An Acre of Ground will require ten Pound *Quantity.* of Seed, and some Land twelve Pound; 'tis better to sow it too thick, than too thin: Some have sown a great deal more with good Advantage. It delights most in a rich warm Soil, and such Lands as are most Dunged, Marled, Limed, &c. as I shall shew hereafter. But the Clays that are long in swarding, and little subject to Weeds, are the best Land for Clover; because in those Lands that graze speedily the natural Grass eats it out, which all sort of light Lands are subject to, and likewise to wash from the Roots of the Clover, so as to leave them bare, which gives opportunity to the Frost to kill it. But in the best Grounds it will not bear any thing of a good Crop longer than three or four Years. To choose good Clover Seed, put some of it into a Glass of Water, and that which sinks is good, but that which swims is naught.

The usual way of sowing of it is, either with *Time.* Barley or Oats, after the Corn is sown, which 'tis best upon this account, to sow something thinner than ordinary. The usual Time of

sowing of it is at the End of *March*, or beginning of *April*, in a calm day ; but the best time of Sowing of it in dry Lands, is with black Oats, as forward in the Spring as you can, that so it may get up while the Rains last, before the dry Weather comes ; some sow it with Wheat or Rye at *Michaelmas*, which gives it an opportunity of shedding of its Seed, and occasions its growing thick, and lasting longer, but then 'tis best sowed upon dry Lands that will bear sowing of both the Wheat and the Rye upon broad Ridges. This way 'tis most certain of taking, if it prove a mild Winter : But if hard Frost and great Snows come, 'tis very hazardous ; tho' some advise the sowing of it alone at *Michaelmas*, which, they say, makes it come up freer from Weeds, than if sown in Spring, and will cause it to get strength enough to preserve it self against the Winter : And some sow Ray-Grass with the Corn at *Michaelmas*, and early in Spring sow the Clover, which they cover only by rowling of it. These ways are what, I must confess, I have not known the experience of, but I am certain that the Frost will not hurt the Root, if it doth not lie bare, though it will spoil all the Grass ; for which Reason most take care to feed it close before the Winter comes on.

Mowing.

About the middle or end of *May*, you may cut the first Crop for Hay, which takes up more Time and Labour to dry than ordinary Grass, and will go very near together ; yet if it grow not too strong, it will be exceeding rich and good for the fattening of Cattle. The exact time for the cutting of it is when it begins to knot. Some after the first Crop mow two other Crops before Winter ; but they seldom have Weather

good

good enough to make the last Crop well; and therefore 'tis better to take but one Crop more, especially if you design it for Seed, which you must let stand till thorough ripe, for it will not be very ready to shed. When you first observe the Seed in the Husk, it will ripen in about a Months time more; and when the Seed begins to change its Colour, and the Stalk begins to die, and to turn brown, and be of a yellowish Colour, mow it in a dry time, and preserve it as dry as you can: It ripens some Years sooner than others; and therefore you must be guided by the Ripeness of it. If Clover is apt to wear out of your Ground, and you have a mind to continue it without new sowing, mow it the latter end of *May*, and let it stand about three Months till it casts its Seed, and then feed it with Cattle, and it will sow it self afresh, and come (as I am told) as thick as if new sown.

One Acre of this Grass will feed as many Cattle as five or six Acres of common Grass. Some reckon the best way to feed Cattle with it, is to put it in Racks, because of the great quantity that they tread down with their Feet, and because it shrinks so much in drying.

Feeding.

Great care must be taken of the Cattle that are first put into it, lest it burst them. To prevent which, some give them Straw with it, and some stint them as to quantity; but the best way is only to turn them into it the first Day about Noon, when the Dew is off, and in a dry Day, for about half an Hour; the next Day for an Hour; the third Day for two; and then for three or four Days put them in as soon as the Dew is off the Ground, and let them stay in till four or five a Clock in the Afternoon, and after that there will be no Danger, especially

ally if 'tis not too wet Weather. If 'tis, be the longer before you let them stay in all Night. However 'tis better for any other Cattle than Milch Cows. But some sow Trefoil or Ray-Grass with their Clover, which very much prevents it doing of injury to Cattle; and as 'tis a Grass that grows very upright, it shoots through the Branches of the spreading Clover, and makes the Crop much better.

Your Clover being preserved dry, about the midst of *March*, thrash it, and cleanse it from the Straw as much as you can, and beat the Husk again; being very well dried in the Sun after the first thrashing, get what Seed you can out of it, and after you have thrashed it, and chafed it with a fine Rake, and dried it well in the Sun again, if you rub it, you may get out a great deal more: Some get above two Bushels out of an Acre, a good Thrasher can thrash out but about six Gallons in a Day. Some say that the best way of sowing of it is in the Husk; but 'tis something difficult to sow that way. The Seed of Clover will grow as well at two Years old, as at the first. If one could get an account from *Flanders* how they thrash their Clover there, it would be of great advantage for the Propagation of it. In some places of *Essex* when they sow their etch Crops, they sprinkle a pound or two of Clover on an Acre and this they feed off in Spring before they fallow their Land, which they do a little later than they would else do, especially if they design their Fallow for Barley.

§ 2. Of *St. Foin* or Holy Hay.

St. Foin where it will grow is esteemed one of the best of these sorts of Grasses, because of its long Continuance and Bulk: In many Lands it will last twenty or thirty Years: Besides it improves the Land it grows on very much; for the plowing in of the Roots is excellent Manure for it, which is what is not usual with these sorts of Seeds. You may break up your Land, and sow it with Corn till 'tis out of Heart, and then sow it with *St. Foin* again. 'Tis reported to grow on any dry barren Land, where hardly any thing else will grow; and the Roots running deep, and growing great, are not soon dried up by the parching Heat of the Sun; though 'tis reckoned to thrive best in a shallow Ground, because else in some Soils 'tis apt to run too deep: But I could never find it to grow upon any Soil in these Parts, except chalky Lands, as at *Royston* in *Hertfordshire*, where it grows upon the miry chalky Clays, and upon the driest part of *Royston-Heath*, which consists of dry chalky Hills. In some parts of *Dorsetshire*, they say, it grows on very stony dry Hills, where the Earth is not above half a Foot deep, its Roots running in between the Cracks of a flaky Lime-stone, the Earth being a light Red-loam. Which makes me conclude it to do best on Land that is sweet, Chalk and Lime-stone being both of a sweetning nature to Land; but I could wish that some particular Observations were made of the nature of the several Lands in the several Counties where it doth grow: For 'tis certainly one of the best Improvements of Land that can be

made use of where it will take, especially where Manure is scarce. You may sow Rey-grass with your *St. Foin*, and I am told it makes a great Improvement of it, and yields a good Crop: The first three Years you may sow five Bushels of *St. Foin* and one Bushel of Rey-grass on an Acre.

A Gentleman of my Acquaintance tells me he has found a very great advantage by watering of his *St. Foin* in dry Weather at new sowing of it, and when it comes up; which he doth with a Water-Cart, carrying his Water in a Cask, to which he has a Tap at the end, which lets the Water run into a long trough which is full of small Holes.

It must be sown in far greater Quantities than the Clover-seed, because 'tis a larger, lighter Seed. They commonly allow four Bushels to an Acre. You need not fear sowing of it too thick, because it the sooner stocks the Ground, and destroys all the other Grass and Weeds. It may be sown alone, or with Oats, or Barley, as the other Grass-seeds are; but you must be sure to make your Ground very fine for this and all other Grass-seeds. Do not feed it the first Year, especially with great Cattle, because the Sweetness of it will provoke the Cattle to bite too near the ground; and large Cattle treading of it is a great Injury to it, especially in wet Weather; and therefore 'tis best Mowing of it the first and second Year, and after that it will be out of danger. The maring of *St. Foin*, when 'tis almost worn out, makes a great improvement of it for three or four Years, and after that the Grass which the Marle produces will be near as good as the *St. Foin*.

The

The best time for sowing of it is in Autumn, *Time.* from the beginning of *August* to the end of *September*, if sowed alone; but if mixed with other Grain, in the Spring, from the beginning of *February* till the end of *March*; the earlier 'tis sown in either Season, the better: And 'tis better to be sown alone, than with other Grain.

If you reserve it for mowing, it must be laid up by the latter end of *March*. The time of cutting of it is when it begins to flower, which is about the middle of *May*, sometimes later. This sort of Hay is very excellent for Horses.

It is the best Food for great Cattle, especially in the Spring. It hath not the danger attending of it, that Clover hath. It breeds abundance of Milk, and the Butter that is made of it is very good. If you feed it with Sheep, let it be in Autumn, and in the Winter: It fattens them very speedily.

§ 3. *La Lucerne.*

This is a Plant much commended for an excellent Fodder, and by some preferred before ~~any~~ other sort, being to be managed after the same way with other Seeds of this kind, and is reckoned to grow on any sort of Land; but the Seed coming from *France*, this War-time hath prevented its being so much propagated as otherways it would have been; and therefore I cannot find those Observations made about it as yet, that might be expected. They sow twelve or fourteen Pound upon an Acre. The time of sowing of it is about the middle of *April*. It may be mow'd twice a Year, and fed all the Winter. The Hay must be well dried and housed, it being otherwise bad to keep. It is

good for all sort of Cattle, but best for Horses; it feedeth much more than the ordinary Hay, and causeth abundance of Milk, and must at first be used with Caution, and be mixed either with other Hay or Straw; you may also feed the Grass, but if you mow it, 'tis best to do it but once a Year. It will last, as I am told, twenty Years. One Acre is reckoned to keep three Horses all the Year, if it takes well. It purges in Spring, and makes any Cattle fat in ten or twelve Days.

§ 4. *Of Rey-Grass.*

This sort of Grass is reckoned to grow on any Land, but chiefly in cold, sowre, clayey, and weeping Grounds. It endures the Summer-droughts, and the Winter-frosts, being the best of Winter-foods, and springs the earliest of any. The shorter it is fed, the better. There can be no danger of over-stocking of it, because if left to grow too rank, the Stalk is apt to grow hard and sticky, 'tis best for Horses and Sheep, and very much prevents the rotting of the latter. Some sow two Bushels on an Acre; but the best quantity is three Bushels, where they sow it with Clover, which is the best way of sowing of it. Where Land is proper for it, they sow eight Pound of Clover, and one Bushel of Rey-grass upon an Acre. It will last upon some Lands seven or eight Years. Some mow it for Hay, and thrash out the Seed, which commonly yields, about *London*, from two Shillings Six-pence, to three Shillings Six-pence *per* Bushel. Some tell you of five Quarters being got off of an Acre. Some, when they find their Rey-grass thin, take a Bushel of Seed and sow

it upon an Acre, and only roll it in, and it will make it very thick. Rey-grafs will kill Thiftles.

If Rey-grafs Seed be cut something green, it makes the best Hay, and the Seed will grow, but not so well as if ripe ; but you must take care, if the Seed is newly thrashed, that it do not lie thick, because it will heat.

§ 5. *Of Hop-clover, Trefoil or Three-leav'd Grass.*

This sort of Grass is finer and sweeter than the great Clover, and upon some Land is a very great Improvement, tho' 'tis reckoned to grow upon any Soil. Mr. *Hartlib* in his *Legacy* says, that there are twenty three sorts of it, and that each sort delights in a particular Soil ; as some of it in watery places, some on dry, some on Clay, and some on Sand, which may give occasion to most to reckon that it will grow on any Land. But there are many sorts of Land that will bear but indifferent Crops of it, which many times may be occasioned by the not suiting of it to the Land 'tis sown on. Concerning which, if strict Observation were made, I believe it might be much improved.

It may be sown with Corn, as Clover, and other Grass-seeds are, or alone only for Grass, or being sprinkled in Meadows, will mend the Hay both in Quantity and Quality. They commonly allow twelve Pound to an Acre. 'Tis reckon'd a more lasting sort of Grass than Rey-grass, especially the yellow Hop Trefoil.

§ 6. *Of*

§ 6. Of several other Grasses or Hays.

Esparcet is a kind of *St. Foin*, and by some judged to be the same.

La Romain, or *French Tares*, or *Vetches*, is a Grain that in *France* is sown annually, and is very quick of growth, being very good Food for Cattle, especially Horses; and after feeding of it the fore part of the Summer, they let it grow for Hay. 'Tis not so good as the other Grass-seeds, because 'tis but of short continuance: 'Tis reckon'd to grow on very poor dry Land.

Spurry-seed is usually sown in the Low-Countries twice in a Summer, the first time in *May*, that it may flower in *June* and *July*, and in *August* the Seed is usually ripe. The second time of sowing of it is after *Rye-harvest*, which Grounds they usually plow up, and sow with this Seed, to serve their Kine in Winter, when other Grass is eat up. It makes excellent Butter. Hens will greedily eat the Herb, which will, as *Mr. Hartlib* says, make them lay the better.

I am told that in *Buckinghamshire* they make good improvement of their Lands by sowing of them with *Parsley*, and that it prevents the Rot of Sheep: One in the Hundreds of *Essex* made a great improvement of some Land by sowing of it with *Mustard-seed* for the same use. But for these sorts of Seeds and many other things, I shall refer you to the Appendix, when I have got a farther account of this and other Particulars, which I shall be obliged to any that will give us any Assistance in the Information of.

If

If you design to lay down any Land for Grasse without sowing of it with Grasse-seed, lay it down when you sow Wheat or Rye, but then your Corn should be sowed on broad Ridges. Some say that *St. Foin, Clover, Trefoil*, and other Grasses of that kind are found to do better, and to be more lasting, when sown alone, and not according to the usual way, with Barley or Oats.

B O O K II.

Chap. I. *Of Arable Land and Tillage.*

A *Arable Land* is accounted a very profitable part of Husbandry, if well managed, where a due Care is taken to suit each sort of Soil with right Seed and proper Manure, and that the Land is proper for Corn, in the knowledge of which lies the chief Skill of the Husbandman, as was observed both by *Virgil* and the Ancients:

*But e'er thou break the unknown Fallow, first
Observe the Winds and Heavens still varying Face,
Old Custom with the Nature of the Place,
What every Soil will bear, and what refuse.*

In order to the attaining of which Knowledge, I shall first begin with a Description of the *Plough*, as the chief Instrument in this Work: And, Secondly, give an account of the way of Plowing, Sowing, and ordering of Land for Corn: And, Thirdly, shew how to order each sort of Grain, and what Soil is proper for them: And,

And, Fourthly, give an account of the several sorts of Soil, with their Natures and Qualities.

Chap. II. *Of the Plough.*

THERE is a great difference in most places about the Make and Shape of their Ploughs; some differing in the length and shape of their Beams, some in the Share, others in the Coulter, and in the Handles, &c. Every place almost being wedded to their particular Fashion, without any regard to the Goodness, Convenience or Usefulness of the sort they use: And as some of them are more convenient in some particulars than others, and suit some sort of Lands better than others, I shall endeavour to give a Description of the most usual sorts of them, with an account of the advantage and disadvantage of each sort, which I think must be one of the likeliest ways of improving this useful Instrument; in order to which I shall first give you an account of what sort of Ploughs are reckon'd best for each sort of Land: Secondly, describe several sorts of Ploughs used in several Places: And, Lastly, give such general Rules as may serve to direct you how to judge what sort of Ploughs are best.

1. The Plough reckoned the most proper for stiff black Clays is one that is long, large and broad, with a deep Head, and a square Earth-board, so as to turn up a great Furrow; the Coulter long and very little bending, with a very large Wing; and the Foot long and broad, so as to make a deep Furrow.

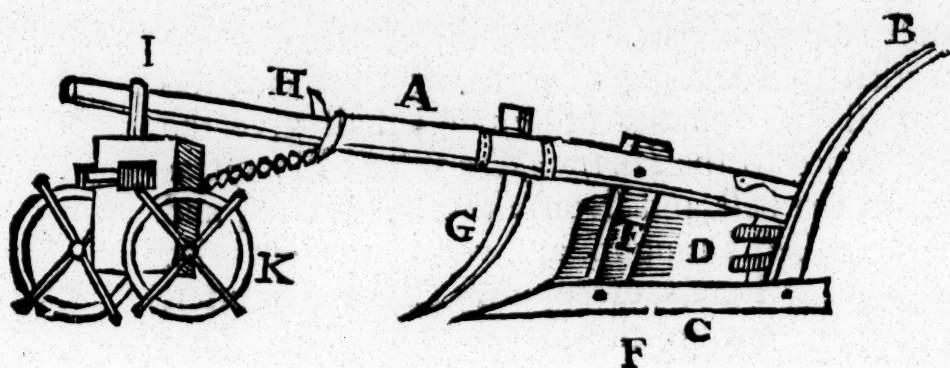
2. The Plough for the White, Blue or Gray Clay need not be so large as the former, only somewhat broader at the Breech, the Coulter to
be

be long and bending, and the Share narrow with a Wing coming up to arm and defend the Earth-board from wearing.

3. The Plough for the Red, White, Sands or Gravel, or any light Moulds, may be lighter and nimbler than the former, the Coulter more circular and thinner, and the Wing not so large.

As to the particular sorts of Ploughs used in several Countries, it would be endless to give a Description of them all, and would be of little advantage; because the different Forms used, proceed more from the Custom of the Country, than any Usefulness that belongs to them; and therefore I shall confine my self only to the most common sort, or to those that have some particular Usefulness belonging to them: Amongst the number of which I shall give the preference to the *Hertfordshire* Wheel-Plough, as one of the best and strongest for most Uses, and of the easiest Draught, and what suits best with all sorts of Lands, except miry Clays in Winter, which are apt to clog the Wheels at that time of the Year; but even for those sort of Lands they are the best Ploughs to plough up Lays or Summer-Fallows with; because they turn the Turf best of any of the common sort, and plow up Mole-hills or uneven Ground without leveling, and Fallow-land in Summer in the driest Weather. The chief Fault that attends them is their Handles standing sloping on one side, which makes them very troublesome to hold, and to follow; especially to those that are not used to them: But that might easily be remedied in the Make of them, were the Makers and Holders of them not wedded to their particular way; the Form of which sort of Plough
you

you have in the following Figure: And as I may often have occasion to name some particular Parts of them, I thought it might be convenient to shew what the Names of the particular Parts of the Plough are; as A is the Plough-beam, B the Handle, Tail, Stilts, Hales or Staves, C the Neck, or Share-beam, D the Earth-board, Mould-board, Brest-board, Furrow-board, Shield-board, &c. E the Sheath, F the Share-Iron, G the Coulter, H the Plough-pin and Collar-links, I the Plough-pillow and Boulster, K the Wheels.

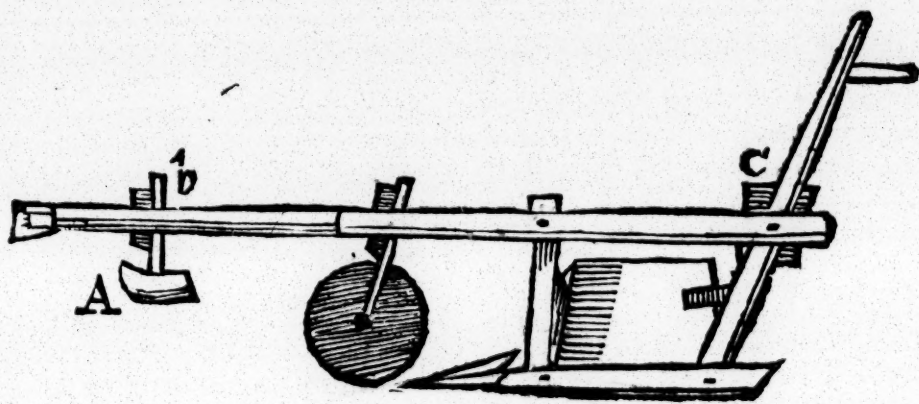


About *Colchester* they have a fine light Wheel-plough, that with two Horses they plough up two Acres in a Day of their light Lands; which sort of Plough is very peculiar for its Earth-board being made of Iron, by which means they make it rounding; which helps to turn the Earth or Turf, much better than any other sort of Plough that I have seen.

The *Lincolnshire* Plough is very particular in its shape, and is a very good Plough for Marsh or Fenny Lands subject to Weeds and Sedge, and that is free from Stones, because of its Coulter

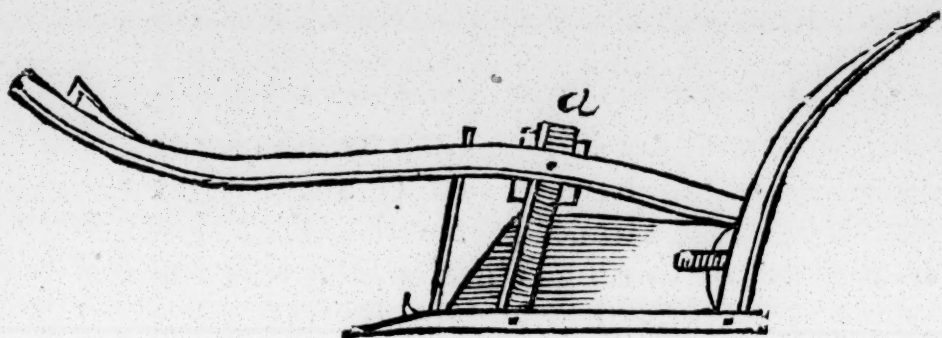
ter

ter, and the largeness of the Share, which they make many times above a Foot-broad, and very sharp; at A is a Foot which they set higher and lower with a Wedge at *b*, which keeps the Fore-part of the Plough from going deeper than they would have it: At C are Wedges that they set the Hinder-part with; the Coulter is a sharp turning Wheel which cuts the Roots of the Grass or Sedge crosses by its Motion as it goes round, while the broad Share cuts the Bottom of their Roots.

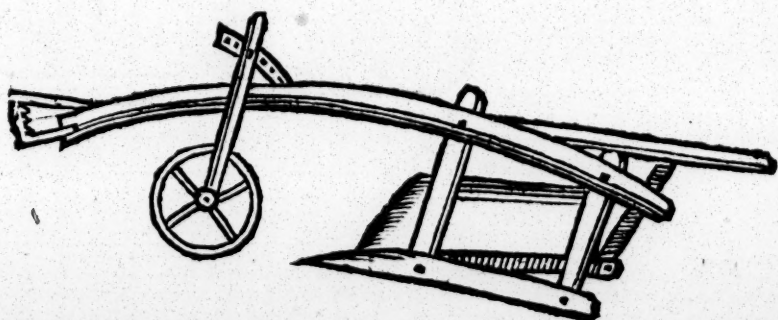


The most common Plough is the following called the Dray-plough, which is the best Plough in Winter for miry Clays, when the Land is soft; but the worst in Summer, when the Land is hard: Because the point is always flying out of the Ground. This Plough is set higher or lower, as they find occasion, by Wedges at *a*, and differs but little from other Ploughs.

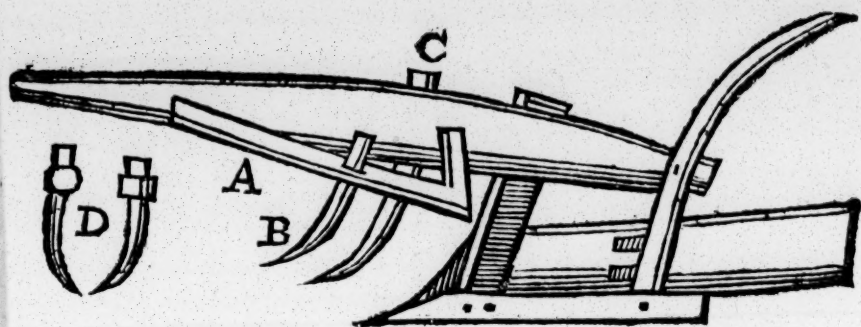
In



In *Suffex* they use much the single Wheel-plough, which is a sort of Plough I should not have mentioned, but for its different Make from most other Ploughs, because they are a very clouterly sort; and as they are very wide in the Breech, I cannot but think the Draught of them to be very hard.

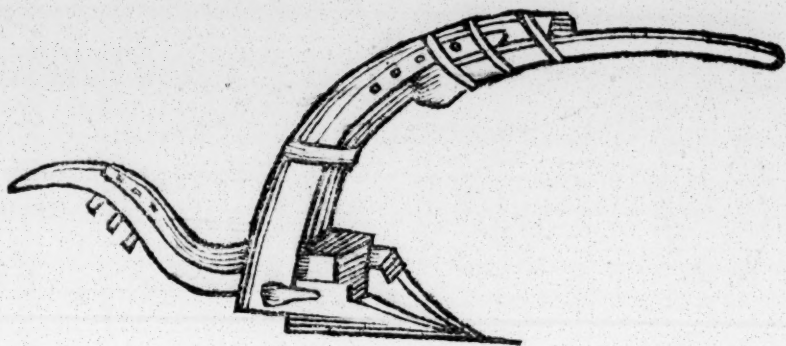


About *Caxton* in *Cambridgeshire* they have a very miry stiff Clay with small rising Grounds, the upper part of which they sow with Corn; and the lower Vallies, because of the poachiness of them, they keep for Grass, which nevertheless in wet Winters are so spewy, that they know not how to feed them; and to cut drains with Spades, they thought would be very chargeable,



chargeable, and so they invented a Plough to do it with; which they made much like another Plough, only much stronger and bigger; and from the Beam stands out a piece of Wood at A, in which is a Coulter set at B, and another set in the Beam at C, which two Coulters stand bending inwards as at D, to cut each side of the Trench. The Share is very broad and flat, and cuts off the bottom of the Trench. The Mould-board is three times the length of other Ploughs, to cast the Turf a great way off of the Trench. This Plough cuts a Trench a Foot wide at the bottom, a Foot and a half broad at the top, and a Foot deep. It was drawn with twenty Horses, and cost three Pounds to make, but the dispatch it made answered the Charge.

The following Plough is a *Spanish* Plough, with one of which, and one Horse, they will in *Spain* plough two or three Acres of their light Lands in a Day; because of the great difference there is in the Make of it from our common Sort, I thought the inserting of it might be of some use to help towards the Improvement of this useful Instrument.



As to the Rules to be observed in the shape of Ploughs : 1. They must be great or small, according to the depth and strength of the Soil you plow, and as the Earth is wet or dry : For which reason every Farmer ought to have several sorts of Ploughs.

2. The Coulter, where the Land is stiff, must be the greater and the stronger, and go the deeper ; which must be proportioned to the Soil, because in deep Grounds the Weeds root the deeper ; for the better cutting up of which, some place on the right side of the Coulter a small Wing or Finn, which cuts in two the bottom of the Roots ; and, I believe, eases much the draught of the Plough.

3. A great matter to be observed in the making of Ploughs, is to make them go true to the pitch they are set, and keep to the Line you set them in without swerving to the right or left, which depends much upon the truth of the Iron-work ; and therefore the Plough should rather be suited to the Irons, than the Irons to the Plough, the Wood-work being easiest altered, if there be occasion.

4. I cannot think a short Plough, or a Plough with a broad Breech, can go so easie af-

ter

ter Cattle, as a long narrow one: For the sharper and thinner any Tool is, the easier it passeth, and the less strength is required: And such an one I believe may be made to turn a Ridge as well as a broader. But when all is said that can be, though the Make of a Plough doth much help Cattles Draughts, yet the main of the Draught lies in the stiffness of the Land you plow, and the depth you go.

Chap. III. Of Plowing of Land.

IN Plowing up of Land we are to consider: *Layes*
First, The plowing of *Layes*, which is the first plowing up of Grass-ground for Corn, and is a Work commonly done in *January*. The best time for the doing of which is when the Land is wet, because the Turf then is tough, and will hold to turn without breaking; in the well-turning of which consists the chief part of this sort of Plowing, which, if done well, will lay the Turf so flat and true, that you can hardly see where the Plough went. This depends much upon the Make of the Plough; for the well-doing of which, if the Earth-board doth not turn the Turf well, some nail upon it a small piece of Wood to take the upper part of the Turf, as it rises upon the Earth-board, which will cause it to fall over with the Grass-side downward, your own Trial and Experience being the best Rule where to place it.

Secondly, The plowing of Fallows, which is a very great benefit to Land, as appears by the common Practice of it, and in the great Care that Landlords every where take to oblige their

their Tenants to a strict observance of it once in three Years, few Lands being able to bear more than two Crops without it ; and I cannot believe that any will find a Years fallowing to be a loss to them, let their Land be what it will ; nor yet the true plowing of it, a Charge that will not pay for their Labour. The advantage of Fallowing consists in,

First, Its laying of the Land in Ridges, and so exposing of it to the Frost, Wind, Sun and Dews, all which sweeten and mellow the Land very much ; the often stirring of it, and breaking of the Clots, disposing of it for the bearing of good Crops.

Secondly, It kills the Weeds by turning up of the Roots to the Sun and Air, and kills not only the Weeds that grow with the last Corn, but wild Oats, Darnel, and other Weeds, that sow themselves, and that as soon as they begin to peep out of the Ground, so that they have no time to suck out any of the Heart of the Land.

The way of ordering of Fallows is after the Crop is off, to let the Land lie all Winter, and what Grass and Weeds grow on it, they eat off with Sheep in *April*, or beginning of *May*. As soon as they have done sowing of Corn, they begin to plow up their Fallows. This first Fallowing in most places ought to be very shallow, well-turned and clapped close together ; because the thinner the Turf is, the easier it will dry through, and kill the Weeds, especially if the Weather be dry : At which time one plowing is worth three other plowings. But in some places where there is a very cold Clay, that will not bear Corn well without being exposed to the Heat of the Sun to

warm

warm it, they plow their first plowing the depth they design to go. About *June* is the time of the second plowing, which they call *Twy-fallowing*; at which plowing you must go your full depth: This plowing is commonly performed by the Team early in a Morning, before the Dew is off the Grass, that so they may have time to feed their Horses, before they go to carrying of Hay in the Afternoon. About the latter end of *July* or beginning of *August*, is the time of *Try-fallowing*, or last plowing before they sow their Rye or Wheat, (though some do plow up their Land oftner.) If the Land rise full of Clots, and if 'tis a binding Land, you must make it fine by harrowing of it when Rain comes; but then you must not let it lie long before you strick, fise, or plow it up into small Ridges, especially if 'tis wet Land: And as near as you can, leave no Weeds or Turfs of Grass unkilld or unbroke with your Harrows; because it fours Land, and causes the Mould to lie hollow from the Roots of the Corn: But if your Land will dissolve well with the Frost, 'tis best to let it lie a little rougher, especially if you design to sow it with Barley, then the rougher it lies for a Winter-fallow the better, because it lies the drier, and the Spring-showers will afford Moisture enough to make it fine for sowing: But if the Winter doth not dissolve the Clots, which it will not do in binding Lands, such as the red Loams are in *Essex*, which Lands they are often forced to wait for Rain for the fallowing of, because they plow only with the Dray-plough, the point of which is always flying out of the Ground in dry Weather, by which means they are often forced to plow their Fal-

lows six or eight times, which doth but seldom kill the Weeds; because plowing in wet Weather doth but remove them out of their places, and turn moist Earth upon their Roots, which makes them quickly grow again. I have often experienced that with the *Hertfordshire* Plough, I have in *Essex* made a better Fallow with three plowings, than my Neighbours could with six or seven. Sometimes where Land is clotty, and a shower of Rain comes that soaks through them, you may make use of a Roll to break them. In *Oxfordshire* they make their Rolls Octangular, the Edges whereof they reckon break the Clots better than the round ones; and in the Hundreds of *Essex*, where they have a very churlish blue Clay, they use large round Rollers, which are stuck with strong oaken Pins about three Inches long, and four Inches distant one from another in the Rows, and each Row twelve Inches asunder. But,

In *Hertfordshire* they always, if they can, plow in dry Weather, and harrow in wet which makes the best Fallows; and always in fallowing of Land they plow one plowing cross the way, that they intend to lay the Ridges when they sow them. But in plowing of Lands cross, I am only for striking of it, and not plowing of it in Ridges, because when you come to plow it up again, and lay it the right way, it will be uneven on the top of the Ridges, and harbour wet.

In *Kent*, I am told, they have some Land so rich, that it will yield good Crops of Corn for twenty Years together without fallowing, and that most of the Land that they fallow, they plow but once before sowing: Nay, often, a Crop of Pease serves instead of it. In *Suffex* they

they plough their Fallows but twice ; but I am satisfied that a well-ordered Fallow would be of much more advantage to them : For if the Land do not need fallowing to enrich it, it will for to sweeten it, and to kill the Weeds, which Fallowing gives the best check to.

Where Land is but indifferent, and Manure is not to be got, Fallowing every other Year is found a great Improvement, and is a very ancient piece of Husbandry, as may be seen in *Pindar*, *Xenophon* and *Virgil*, who advises thus,

*But if the Soil be barren, only scar
The Surface, and but lightly print the Share,
When cold Arcturus rises with the Sun,
Lest wicked Reeds the Corn should over-run
In watery Soil, or least the barren Sand
Should suck the Moisture from the thirsty Land.
Both these unhappy Soils the Swains forbear,
And keep a Sabbath of alternate Year,
That the spent Earth may gather heat again,
And better'd by cessation bear the Grain.*

Virgil. Georg.

In some places they take a Crop of Wheat, and a Crop of Pease, and so fallow their Land again.

In *Staffordshire* they often give their Lands a Winter fallowing, besides the three Summer fallowings, and lay their Land up in Ridges when they sow Barley, which seems the way of the Ancients by *Virgil*,

*That Crop rewards the greedy Peasant's Pains,
Which twice the Sun and twice the Cold sustains.*

Pliny likewise commends much the Plowing of Land four times, but you must observe in Winter to harrow no more down than what you can quickly rear up again upon an edge ; because if much Rain come upon it while it lies flat, it will make it so poachy that you cannot plow it, (especially if 'tis a wet Clay Land) and cause it to breed Weeds ; and therefore the best way in such a case is to plow up in a Morning, and harrow down in the Afternoon what you design to plow or strick the next day : Or you may harrow it in the Morning just before you plow it. And if Land be weedy, by reason of the wetness of the last Summer, plow it up as soon as you can in Winter to kill the Weeds, and to mellow it ; some upon Lands that they design for a Fallow the next Year with the last Crop of Corn, sprinkle four or five Pound of Clover upon an Acre, which serves them to feed at *Michaelmas*, and the next Spring 'till about *Midsummer* ; at which time they begin their first fallowing, and in *August* they plow it up into small Ridges, and so let it lie for a Winter Fallow, ordering of it for Barley the next Spring after. Where you have a good Soil underneath the Surface of your Land, and have a mind to mix it with your upper Soil or Surface, it may be done by one Plough making of a deep Furrow, and another following in the same Furrow, or by Plough-trenching, which is for a Plough to make a deep Furrow and to have eight or ten Men with Spades to follow the Plough, and making the Trench a spit deeper, fling off the Earth on the Ridge the Plough made.

**Chap. IV. Of the Laying of Land in Ridges,
and the sowing of it.**

Some in plowing up their Lands, lay four Ridges together: In the Hundreds of *Essex* they lay six or eight Ridges together: in *Huntingtonshire*, and many other places where are very stiff moist Clays, they sow all upon broad Lands, raising the middle of the Ridges in some places near a Yard higher than the side Furrows, which certainly must drain those poachy Clays the best of any way; for the chief design of laying Land in Ridges is the draining of it, and the making of the Corn to grow dry. But this way of laying of Land can only be done in a deep Soil, where the descent of the Ground doth not require the Ridges for the draining of the Land to be laid otherways; they chuse to have the Ridges to run East and West, because the Sun comes between them the better.

Be sure what Furrows you leave to lay them open and clean scowred, so as to carry away all the standing Water and Moisture, and at all the lowest places make Drains that may lead well into one another. Where the Plough will not make them deep enough, let it be done with the Spade: For in the well-draining of Corn-lands lies a main advantage: And observe in making of your Drains both for Corn-land and Pasture, not to lay the Earth you dig out of them in heaps or otherways near to them; but either let it be carried out at a distance from them by the Spade, or in Carts or Wheel-barrows, if 'tis Grass or Fallow: And by this means you will constantly be lowering of
your

your Land next the Drains, which otherways will be treading in again, and always stopping of them.

If 'tis dry Weather in the Spring, that your Land should rise full of Lumps, the lying in the Air, if 'tis a binding Land, will sometimes cause them to grow so hard that you cannot break them, as I said before, without a great deal of Rain to moisten them, which may be inconvenient for you to stay for ; in such case harrow it as you plough it up, but then, except it be very dry Land, you must speedily plow it up to an edge again.

Some sow their Lands under Furrow, as they call it ; that is, they sow the Corn in the Furrow, and then plow a Ridge upon it to cover it ; and some harrow their Ground over, and sow Wheat or Rye on it with a broad Cast : Some only with a single Cast, and some with a double, and then plow it upon an edge in broad Lands where the Land is dry ; and some plow their Land up an edge for broad Furrows, and sow their Wheat or Rye on it, and then harrow it over : Either of these ways, but especially the latter, I believe to be better than the common way of sowing of Wheat and Rye under Furrow in binding Lands, and in shallow or very wet Soils, because it doth not bury the Corn so deep as the other way : For your Furrows should be deep or shallow, according to the depth of the Soil.

In Cold sow Wheat or Rye earlier, and in hot Lands later ; but for Summer Corn plow your poor Land first ; but sow your cold Land last.

In *Hertfordshire* they sow all their Barley with a broad Cast upon broad Ridges, and in *Essex* on small Ridges like Wheat, where they have two small Harrows that clap on each side of the Ridge, and so they harrow it right up and down, and roll it with a Belly Roll that goes between the Ridges, when they have sown it: But I think the large square Harrow the best; and if every Farmer had two or three sorts, one a degree finer than the other, I believe it might be a great help to them: For the well-covering of the Seed must be of great advantage. If Land lie upon the side of a Hill, and be very dry, if when you lay it down for Grass you should plow the Furrows somewhat cross the descent of the Hill, according to such proportion of Wet as you would have it hold I cannot but think that it would be of great improvement to such Land so to do.

Chap. V. *Of Sowing of Corn.*

GET your Seed from a worse Soil than your own if you can; if not, 'tis better to have it from good Land, than not to have Change: For all Seed doth degenerate if long sown upon any Land, but most upon bad Land. This the Ancients were sensible of, as appears by *Virgil*,

*Your changed Seed delights the pregnant Plains,
And Ground left fallow grants no little Gains.*

In the South-part of *Staffordshire* they go to the North for Seed-corn; and they of the North to the South, except in the Moor-lands, where

where they always choose to get the biggest Seed they can, because their Corn is apt to come to nothing, if not renewed from other Parts. But the having of Seed from the Northern Countries to the South is much the greatest Improvement, and the farther Northward the better, and the more will be the advantage. The smallest Seed is reckoned the best, of Wheat, Rye or Barley, if it be clean from Soil: But I believe they judge it so rather upon the account of the number of Grains that go to fill the Bushel, than upon the account of the Produce. Variety of Seed is likewise an advantage to Land, because every sort of Grain draws and attracts from the Earth only its proper Juice suitable to the Nourishment of its own Body: So that the sowing of the same Grain often exhausts and weakens the Ground by still attracting of the same sort of Juice, one Crop after another.

In sowing of Land great regard ought to be had to the Weather, and the Temper of the Land you design to sow, with the sort of Seed you intend to use. Dry Land may be sowed in wetter Weather than moist; especially if the Seed be what will bear Wet, or that the dry time happens against Winter, when you may be sure of Rain coming; as if you design to sow Rye or Wheat, the first of which Seeds cannot be sowed too dry, nor the other too wet, except 'tis so miry that the Plough cannot go, for which reason the Rye should be sown in dry Land and in dry Weather, and the Wheat in moist: And therefore it was that in *September 1699*, which was a very dry Time, the Rye that was sown then did very well, and came up presently without Rain: But several sowing
of

of Wheat at that time, because 'twas the usual time of doing of it, it lay in the Ground till Rain came, which was the latter end of October first, and then but part of it came up neither, because it was mustied and spoiled with lying so long in the Ground; and what did come up was chiefly upon the sides of the Ridges, for the Ground was so dry, that the Rain could not soak through the top; and therefore only reached to the Roots of the Corn on the sides that were but slightly covered: For which reason they having the whole Winter before them, I think that they had much better have staid longer for to sow their Wheat till they had had some Rain first: But all Summer Corn doth best in a dry time, except black Oats, which require more Moisture, as I shall shew more at large hereafter.

Chap. VI. Of Steeping of Corn.

WHeat they commonly steep in Brine twelve Hours; and drawing the Brine from it, they mix it with unslacked Lime beat to Powder, and so sow it when dry, which is reckoned of great advantage, and to prevent the Smuttiness of it. Some others propose to drain Dunghills, or to dissolve Sheeps Dung in Water, and to add to it as much Salt as will make it a strong Brine, in this Liquor to steep your Corn: Wheat eighteen Hours, Barley thirty six Hours, and Pease twelve, and to dry it with unslacked Lime powdered; and that if you put Wormwood into the Brine you soak your Corn in, it will prevent the Birds eating of it: But as my design is chiefly to promote

mote tried Experiments, so I shall not insist upon these things, but rather trust to what real Experiments I can get an account of from such as are willing for a publick good to communicate them.

In Mr. *Houghton's* Papers of Husbandry and Trade, N^o 14. you have several Experiments made about the steeping of Wheat and Barley in a certain Liquor, which, he says, occasioned a very great increase; which Liquor was made after this manner: " Take a convenient quantity of Rain-Water, and in every Gallon of
" it dissolve two pound of Stone Lime, let
" it stand two or three days, stirring of it three
" times a day, pour off the Water into another
" Vessel, and to every Gallon of this Water
" put about four ounces of Salt-peter, and one
" pound of Pigeons Dung; mix them well together, by stirring of them three or four
" times a day, and then strain out the Liquor
" to keep for use. He took, as he says, a handful of Wheat, and put it into a quart of this Liquor to steep; and when it had lain about eighteen Hours, he took it out, and laid it to dry in the Air for the space of one day, and then steep'd it in the Liquor again about twelve Hours; and having laid it to dry, as before, he steep'd it again a third time about six Hours, and then set it in his Garden, which was but common Earth; he set it by single Grains, about ten Inches apart, and a Finger's length in depth. He does not remember whether every Grain came up or not, but he thinks that very few failed: Those which did grow, produc'd an increase beyond expectation; from several Grains he had sixty or seventy, and from some eighty Stalks, with very large Ears

full

full of large Corn; many of the Ears being six Inches long, had sixty Grains in them, and none less than forty. This, he says, he shewed to several.

The same Person steeped also Pease and Beans in the same Liquor, but whether they were steeped too long he could not tell, because none of them came up; but he took the thick matter that was strained from the Liquor, and mixed it with four times the quantity of Earth, and let it lie all Winter in a Gravel Walk, South of a Codlin Hedge; he made a row of holes with a Stake about four inches distant, and into each hole he put a handful of the said mixture with a Pea upon it, and cover'd it with common Earth, which grew upon the Codlin-Hedge to be about nine foot high, shooting out branches in several places like Vines, and bore very many large Cods; so that he judg'd he had above a Bushel from about three or fourscore Pease.

He tried also an Experiment on Wheat infused in Lime-Water alone, and some in Brandy alone, and some in Brandy and Lime-Water mixed, and had from each Grain a great increase.

With some of the Liquor made with Saltpeter, Lime and Bigeons Dung, he water'd several Trees and Plants in his Garden, and found them grow and flourish much faster than any other of the same kind. He also steeped Barley in the same Liquor, and found its increase as much as that of Wheat.

B O O K I I I.

Chap. I. Of several sorts of Soils, their Natures, Product and Management.

ALL sorts of Land may be reduced to Sandy, Gravelly, Chalky, Stony, Rocky, Hazely, Black Earth, Marsh or Boggy, and Clay-land, of which last some are Black, Blue, Yellow and Red.

In many places several of these Soils are mixed together; where they are, they are much better, than when alone, especially where the Hot and the Dry is mixed with the Cold and the Moist: For which reason any Clay laid upon Sand or Gravel, or Sand upon Clay, is the best Manure, because it alters and changes the Nature of the Land it self, whereas Dung and such things improve them but for a time: Only observe, that mixed Soils that tend most to Clay, are fittest for hard Corn, and those most inclined to black Mould or Sand, for lighter Corn. And 'tis not only the natural Soil that we are to consider, but the depth of it, and also what Soil is underneath it: For the best and richest Soil, if but half a Foot or a Foot deep, if it lie upon a stiff Clay, or hard cold Stone, is not so fertile as a leaner Soil of greater depth, or lying upon a warm Limestone, Sand or Gravel, through which the superfluous Moisture may descend, and not stand upon the Clay or Stone to chill the Roots of the Grass or Corn: And likewise the Climate

is to be considered, for even in *England*, cold moist Clays are much more fruitful in the South than in the North, with the quantities of the Mixture of each Soil, and what it most abounds with : And likewise the natural produce of the Land, as to Weeds and Grass ; and when plowed, what Corn agrees best with it, and what effect plowing hath upon it : Concerning all which Particulars I have not had opportunity of making so many Observations as I should have done ; but what I am wanting in at present, I hope by farther Endeavours, and the assistance of those that are willing to promote good Husbandry, to inlarge upon. But before I enter into a particular Description of the several sorts of Land, I shall first lay down some general Rules for the knowing of fruitful and unfruitful Soils, and secondly give some general Rules for the ordering of Land for Corn.

All Land that moulders to Dust with a Frost, with all sorts of warm Lands, Black Mould, Yellow Clays, if not too spewy and wet, and that turns black after Rain, are good for Corn : For as old *Tusser* well observes,

*The Soil and the Seed, with the Sheaf and the Purse,
The lighter in substance, for profit the worse.*

And Land that produces large Trees, Black-Thorn, large Weeds, Thistles, rank Grass, &c. and that lies in Bottoms open to the East or South, being well shelter'd from other Winds, is a sign of fruitful Lands. Thyme, Strawberries, Bettony, &c. direct to Wood, and Chamomile to a Mould disposed to Corn.

All Land that binds after Frost and Rain, that turns White, and is full of Worms, that

is extreemly Moist or Cold, or too Hot or Dry, that lies on the North sides of Hills, exposed to cold Winds and Frost in Winter, and scorching Heat in Summer, that bears Holly, Yew, Box, Junipers, Ivy, Brakes, Furz, Broom, Heath, Ling, &c and Lands that bear Moss, Rushes, Yarrow, Wild Tanfie, Flags, &c. are a sign of Cold Land ; and Plants appearing Withered or Blasted, Shrubby and Curled, are the effects of immoderate Wet or Heat, and cold interchangably. Black, Dun or Yellow Sand, and very hot stony Gravel are generally very unfruitful. Chalky Lands are naturally cold and sad, and therefore require warm Applications and light Compost, which is one reason why Chalk is so great an Improver of light hot dry Lands. Sandy Land marled will bear good Sidore, or white or blue Pease, and also Turneps.

Chap. II. *The general Rules for the ordering of Corn-Lands.*

AT the first plowing up of Layes, they commonly sow the first Crop with White or Black Oats, according as the Land is dry or moist; the next Summer they fallow it; and as the Nature of the Land is, sow it with Rye, Wheat, or Barley; and the next Crop, which they call the Etch-Crop, with Oats, Beans, Pease, &c.

But where Land is rank, 'tis not good to sow Wheat after a Fallow; but Cole-seed or Barley, or both, and then Wheat: and where you find dunging of Land makes it too rank, lay your Dung upon the Etch, and sow it with Barley. Which

Which generally doth better in rich Land, than other Corn; and after that, fallow it, and sow it with Wheat.

Some after a Fallow sow their Land with Wheat; the next Year they fallow it again, and sow it with Barley; the next Year with Pease, and then fallow it again, and sow it with Wheat. This is a good way where Land is not in heart, and Dung and Manure scarce, especially in the hazely red Brick-earths in *Essex*, that are made more fixed and solid by plowing.

In *Suffex*, where they have very stiff Clays, after a Fallow they sow two Crops, and lay down their Lands with Clover and Ray-grass for three Year, and then lay on twenty Loads of Dung upon an Acre; or else they Lime or Chalk it while it is Grass: This is a very great Improvement of stiff Clays, in that it fits them for Corn and Grass too; natural Grass being what they will hardly bear, if plowed up, unless they lie a great many Years, and are well dunged.

Chap. III. *Of the natural Produce, and way of ordering of several particular sorts of Land in several Countries.*

CLay-lands are either Black, Blue, Yellow or White; of which the Black and the Yellow are the best for Corn, and the White and Blue the worst; some of which is of such an obstinate ill-natur'd Temper, that nothing will subdue it; and so greedy and voracious, that nothing will satiate it without very great Industry. It turns every thing that is laid up-

on it to its own substance ; and though some Clays are more pinguid, and others more slippery, yet all of them are very tenacious of Water on the Surface, where it stagnates and chills the Plant without penetrating ; and in dry Seasons is costive, hardning with the Sun and Wind, till they are unlocked by Industry, and rendred more kind, so as to admit of the Air and heavenly Influences. The chief Produce of these Lands for Corn, are Wheat, Barley, Gray-pease, Beans, &c. The natural Produce as to Weeds is Goose-grass, or Wild Tansie, large Daisies, Thistles, Docks, May-weed, Poppies, &c. Some of these Clays will bear good Clover and Ray-grass, if well dunged. The best Manure for them is Dung, especially Horse-dung, Alhes, Chalk, Lime, Soot (especially if they are mossy) some sorts of Marle, Folding of Sheep, Pigeons-dung, Malt-dust, &c. Clays hold Manure the best of any Lands, and yield the best Grain, especially where there is a Mixture of Lime-stone with it. They commonly sow these Lands at first breaking up with black Oats: Fallow them as before described, and then sow them with either Wheat or Barley, and the Etch-Crop with either Oats, Pease or Beans, &c.

Chalky Lands. Their best Produce of Corn, is Barley and Wheat ; Oats will do well on them. Their natural Produce for Weeds is Tine, Poppies, May-weed, &c. For Grass-feed, *St. Foin*, *Trefoil*, and, if rich, *Clover*. The best Manure for these Lands is Rags, Dung, Folding of Sheep, &c. These Lands, if Rain happen to fall on them just after sowing, before the Corn gets up, will cause the Earth

to bind so hard, that the Corn cannot get through it.

In *Hertfordshire* they order these Lands for Corn the same with the Clays above-mentioned. In *Oxfordshire* they commonly manure these Lands with half-rotten Dung, which they say prevents the binding of it, and some mix it with Sand, which causes it to work short, especially if any thing dry; they commonly sow them there with Wheat, Mullen and Barley; only after Wheat they sow Pease or Vetches: In the sowing of which they are forced particularly to take care to have fair Weather, because of the Lands binding; but if they have but two Nights dry Weather, they will do well enough.

Sand and *Gravel* Grounds easily admit of Heat and Moisture; for which they are not much the better, because they let it pass too soon, and so contract no Ligature; or retain it too long, especially where the bottom is of Clay; by which means, it either parches or chills too much, producing nothing but Moss or cancerous Infirmities: But if, as sometimes it happens, that Sand have a Surface of a more genial better Mould than ordinary, and a bottom of Gravel or loose Stone, though it do not hold the Water, it may produce a forward sweet Grass, and though 'tis subject to burn, it quickly recovers it self with the least Rain.

Of pure sheer Sand. There is White, Black, Bluish, Red, Yellow, Harsher and Milder, and some that is but meer Dust, that is very light; and the Gray, Black and Ash colour'd that is often found in heathy Commons, which is the most insipid of any. Gravels are much of the same Nature and Kind; only the most stony, or

they that are mixed with harsh Sand, are the hottest and the most barren.

The best Produce of these Lands in Corn is Rye, white Oats, Brank-turneps, &c. The natural Produce in Weeds is Quitch-grass, Sorrel, Broom, Furz, Brakes, Ling, Heath, &c. Their best Manure is Marle, or any sort of Clay that will dissolve with the Frost, Cow-dung, Chalk, Mud, and half-rotten Straw from the Dung-hill, to prevent their binding. These Lands are commonly ordered for Corn as the Clays; but where any of them are over-run with Broom, Furz, &c. in *Staffordshire* they commonly marl them, which kills all that sort of Trumpery; only the first sowing is with Buck-wheat, for which they make three Fallows in Winter, and stir them in *May* following; at which time they sow them, allowing one Bushel to an Acre, which generally yields there sixty again: And so by once plowing up of these Lands, after the Crop is off, 'tis fit for to sow Rye on.

In *Oxfordshire* they seldom give these Lands above two Fallows for Wheat, except they are much over-run with Weeds; of which sort of Grain they reckon the White and Lammas-Wheat the most agreeable; and after a Fallow, Rath-ripe, Barley, they generally fallow them every other Year, and reckon them unfit for Beans or Pease, though they sometimes sow them with Winter Vetches; if with Pease they account the Rath-ripe Pea the best. These Lands must be constantly fallowed.

In *Herefordshire* they make a very great Improvement of sandy Lands that are much given to Moss, by burning of the Moss, and mixing of the Ashes with Lime, and plowing of them

up. They sow them with Rye, which yields a mighty increase, and brings a very good sort of Grass upon them, when laid down after a Crop or two.

Stony Lands are either such Lands as are full of Flints and large Pebbles, or Lands that have a Mixture of Free-stone, Marble or Lime-stones; the Produce of which is much according to the Nature of the Earth they are mixed with: Where the Stones are of a cold Nature, 'tis good to pick them out; but in light dry Soils they are to be left.

In *Oxfordshire*, where they have a lean Earth and a small rubble Stone, or a sower sort of Land mixed with it, they manage it according to its being full of Grass and Weeds, or its being clean. If they are weedy they fallow them late; but not so late as sower Grounds: If they be scary, as they call it, that is, if they have no sward upon them, either they fold them in Winter, and add to the Sheeps-dung some Hay-seed to make it Grass; or else they lay old Thatch or Straw, and Dung upon it: For they reckon if these sorts of Lands have no sward on them before they are fallowed, they will by no means bear a Crop, but a great deal of May-weed, &c. In *September*, *November* and *December* they fallow as the Sward directs them: If 'tis done in either of the two last Months, 'tis called a Winter fallowing, which they never stir again till they plow it up and sow it with Barley; and these Lands are reckoned to do better than if finely tilled: They will bear Wheat and Meslin in a kindly Year, and good Barley if kept in heart. They fallow these Lands every other Year, except they sow Pease on them. Sometimes they are sown with Dills

or Lentils: When they are quite worn out, they lay them down with Ray-grass and Trefoil: But the common stony Lands they order much as the Clays.

Red Hazely Brick Earth, that they have in many places in *Essex* (which is more properly I think a kind of Loam) being like red Clay, only it differs from Clay in its binding quality, and in that it lets whatever Rain falls on it to sink through immediately, and in that it hath no Stones in it: Whereas all Clays hold the Water that falls on them till the Sun and Air dries it up, and after Rain with a Frost moulders to Dust, and have Stones mixed with them; these Loams are an excellent Mixture with other sorts of Earth, being an excellent Mean between other Extrems, uniting what is too loose, cooling what is too hot, and gently entertaining the Moisture. The best Produce of these Lands in Corn is Rye, if well dunged, Barley, white Oats, Buck-wheat, Turneps, Wheat and Pease, if well chalked, marled, or mixed with Clay. Its natural Produce of Weeds is Broom, Fern, Quitch, sowre Grass, and almost all sorts of pernicious Weeds. Of Grass-seeds, Clover, if well dunged, and Ray-grass; but the Clover quickly wears out of it. The best manure for these Lands is Chalk and Sea-coal-ashes. Marle makes a mighty improvement of them, and a stiff yellow Clay that moulders with the Frost, that in many Places lies under it, being full of small Chalk-stones, Lime, Horse-dung. Burning of this Land and mixing of the Ashes with Chalk, I believe would be a very great Improvement of it. What amendment you bestow on this sort of Land, with Dung, or other sort of

Manure,

Manure, that doth not change the Nature and Quality of it, lasts but a little while.

These Lands bind very much after Rain, and turn very white; no Frost will dissolve the Clod; and if they are new plowed up, and never so much Rain comes on them, you may walk or ride on them as firm almost as on a Gravel: These Lands are very subject to Worms, which destroy both the Corn and the Grass very much, especially the Winter-Corn, if they are not often plowed. They run much to Grass and Weeds, and the Corn very much to Straw, and yields but little Corn in wet Years: They graze well the next Year after plowing, nothing being a greater Improvement of them than plowing; because it makes them solid, and sweetens them; so that instead of a sower rank Grass, it makes them bear a sweet Honey-suckle. These Lands are ordered for Corn as the Clays; only as they are rank Lands, and run much to Straw, so 'tis best to dung them upon the Etch-Crop, and to sow them with Barley, and never to dung the Fallows. But where you have not a mind to plow these Lands up, and find the Grass on them sower and full of Weeds, mow them one Year, and keep them short fed with Sheep, which improves and sweetens them very much.

In *Northamptonshire*, Mr. *Moor* says, that the red and sandy Lands which will not hold Manure, they commonly plow but once for one Year's Crop, and that is just before their sowing time, and manure it but just before they plow it; because upon plowing of it oftner and manuring of it sooner, they find a great part of the Soil washed below the Surface of the Earth, and below the Roots of the Corn; and in

in their stony or kealy Soil (as they call it) which is a very light, shallow Soil upon a Lime-stone; so that whatever Rain falls on it, it soaks through it immediately. They never plow it in Ridges when they sow it, but always lay it flat and even, and commonly sow it with Rye, White Oats or Blue Pease. This Land, though so shallow, will bear good *St. Foin*; also Dills, Lentils or Vetches, especially when the Lime-stone is broke in small pieces, and has cracks between the Stones, which they call creach Land.

In *Oxfordshire* they have a sort of red Land which they begin fallowing as soon in the Year as they can, before the Sun is too high: If 'tis moist when fallowed, so 'tis not too wet, they esteem it the better: They seldom give it a second stirring, and reckon that if 'tis too fine and light, that it occasions its running to May-weed, and other Trumpery; a Mixture of Cow-dung and Horse-dung and Folding of Sheep, they reckon the best Manure for it: they sow Wheat, Meslin, Barley and Pease on it, and fallow it every other Year.

Heathby Land. In *Kent* they cut up the Heath in May, and when 'tis dry, burn it, and spread the Ashes, and then plow up the Turf with a broad finned Plough, which they burn likewise, and mixing of the Ashes with Lime and Sea-sand, where to be got, they spread it, and upon all lay a good Quantity of Dung. About the latter end of *September* they sow it with Wheat for three Years, the fourth Year with Barley, being folded with Sheep: The fifth, sixth and seventh with Oats, and the eighth with Pease; and after that it will bear very good Grass.

In

In *Staffordshire* they stock up the Heath in Summer, and burn it, mixing the Ashes with Lime, allowing four Load to an Acre, each Load containing four Quarters, which they plow under Furrow about the Middle or the latter end of *September*, or beginning of *October*. They sow it with Rye, allowing two Bushels to an Acre, the Increase of which is commonly twenty five Bushels. After Rye they sow Barley, in order to which they make three Fallowings, one in *October*, one about *Candlemas*, and another in *April*, which yields much the same quantity as of Rye. Next to Barley they sow white Pease, for which they plow but once in *March*, allowing three Bushels to an Acre : After which they sow Oats, either white or red, if the Land is in heart ; if not, black, for either of which they allow but one plowing in *March*, and then they lay it down for Grass.

Gouty, moorish, peaty, cold, black, Land. This sort of Land in *Staffordshire* they order much the same way with the heathy Land, only they burn it deeper ; but it bears little but Oats ; white Oats upon the gouty, and black Oats upon the black cold Lands : The Turf of these Lands burnt and carried upon Rye or Barley-lands they reckon a better Improvement than Dung.

Black Mould that is somewhat fat, yet porous, light, and sufficiently tenacious, without any Mixture of Gravel or Sand, rising in gross Clods at the first breaking up of the Plough, and sheldring with the Frost, is good Land both for Corn and Grass : Which Opinion the Ancients had of them, as appears by *Virgil*, who says, that

Black

*Black Grounds which under heavy Ploughs are rich,
A brittle Soil (for Tillage makes it such)
Is best for Corn, upon no Ground appears
More Wains returning home with weary Steers.*

But as these sorts of Lands are mostly in bottoms, so the Wetness of them often spoils them for Corn; but where they are dry, they are extraordinary fruitful, especially for Barley; they will bear also good Wheat upon the Etch-Crop: But if they are very rich, that you fear lodging of the Corn, you may, if a deep Mould, plant them with Liquorish, or sow them with Hemp, Oad, Cole, Rape-seed or Madder, or some other rich Commodity, that best agrees with rich Land; and afterwards with Corn, when some of the Fertility is abated. The natural Produce of these Lands is commonly Thistles, Docks, and all sorts of rank Weeds and Grass. It will bear excellent Clover. The best Manure is Chalk, Lime, Dung, &c.

Where Lands are sowre, the best way to sweeten them is to chalk them well, where 'tis to be had, while they are Grass: letting of them lie for one Year or more, and then plowing of them up, give them a good Fallowing, especially in a dry time in Summer, which will kill the Quitch, Sorrel, Moss, and other Trumpery, that these Lands are subject to, and mellow them the best of any thing; also Soot, Ashes, Dung and Marle, will sweeten some sort of Lands.

In Oxfordshire, I am informed, they give their sowre Land a tilt, according to the State and Condition of their Lands; if it have a great deal of Grass, they fallow it when the
Sun

Sun is pretty high, which they call a scalding Fallow, which kills the Grass-roots, and makes the Land fine ; if 'tis light, and have but little Grass on it, they plow it early in the Year, and then there will come some spinny Grass that will keep it from scalding in Summer ; for if they suffer it to scorch when light, they reckon that all they can do will not procure a Crop. But, as I know not the Nature of this Land, so I can give no Reason for their Management of it. They likewise reckon folding of Sheep very good upon these Lands ; and if they lay Dung upon them, 'tis commonly before stirring. But Pigeons Dung and Malt-duff they reckon the best, because they are cold Lands, which they both plow and sow in with the Corn, to keep the Roots of the Corn warm ; only they observe not to plow or sow it in very wet Weather.

Thus I have given an account of several sorts of Land, and of several ways of managing of them, in hopes that others will help me with what they can pick up of this Nature, which I design to add by way of Appendix, as I promised in the beginning, which I cannot but think will be of very great use to the Improvement of Husbandry ; because by this means every one will see the distinct Methods used in several places, and the Reasons of their so doing : But then I must desire all to be very particular in describing of the Land they send an account of ; and if they please to send their Names, that we may know how, if there be occasion, to send such Questions to them as may be needful for the making of a true Judgment of things, it will still add to the Advantage that may be made of this Method.

I shall conclude this point with giving an account of an Experiment of Mr. *Houghton's*, to know what quantity of Sand any Earth or Marl is mixed with, which may be of use to try the Nature of several sorts of Land by. He took a piece of Clay, such as the Brewers stop their Casks with, which is commonly a sort of yellow Tile-Clay, which weighed four Ounces and a half Averdupois, this he dissolved in Water, and poured off the thick into another Bason, till all was gone but the Sand, which stuck not together, but lay loose in the Water, and when it was dry would run like Hour-glass-sand, of which he had about the quantity of an Ounce, being of a yellow Colour, and something glistning, and some little Stones and other foul matter was with it; and when the Clay was settled, he poured off the Water, and left the rest to dry in a Pewter Bason, which hung together, only 'twas full of Cracks.

He tryed likewise Fullers-earth, which left a thick Settlement, and when dry would easily break to Powder; but he could find no Sand in it, neither by the Microscope, nor any grittiness by rubbing of it between his Fingers.

B O O K IV.

Chap. I. *Of Manuring, Dunging and Soil- ing of Land.*

HAVING given you an account of the way of ordering of Meadows, Pastures and Arable Land, with several sorts of Improve-

Improvement of them ; I shall in the next place proceed to give an account of the several ways used to improve Land by Manure, Dung, and other sort of Soils.

Chap. II. Of Burning of Land.

Burning of Land is not only a very great, but a very ancient way of Improvement, as may be seen in *Virgil*, who says,

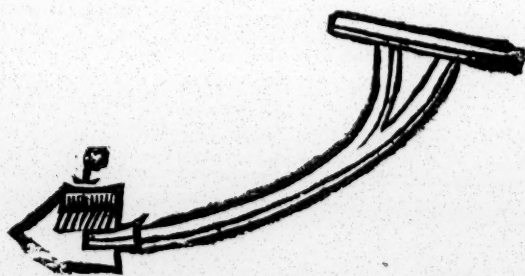
*Long Practice has a sure Improvement found,
With kindled Fires to burn the barren Ground.
When the light Stubble, to the Flames resign'd,
Is driven along, and crackles in the Wind,
Whether from hence the hollow Womb of Earth
Is warm'd with secret strength for better Birth,
Or when the latent Vice is cur'd by Fire,
Redundant Humours through the Pores expire ;
Or that the Warmth distends the Chinks, and makes
New Breathings, whence new Nourishment she takes :
Or that the Heat the gaping Ground constrains,
New-knits the Surface, and new-strings the Veins,
Least soaking Showers should pierce the secret seat,
Or freezing Boreas chill her genial heat,
Or scorching Suns too violently beat.*

that the heat of the Fire warming of the Land wastes the acid,steril Juices that hinder the Fertility of it, and leaves a Salt upon the Ground, in which (being mixed with the Ashes) the Fruitfulness consists.

Burning of Land or burn-beating, commonly called *Denshiring*, (that is, *Devonshiring* or *Denbighshiring*, because most used or first invented there) is not proper for any rich Soils, or dry stony

stony Lands, or chalky Clays ; nor is it a thing too often to be repeated on any Soil, especially where the Soil is shallow ; nor must Corn be sown too long on such Lands : For burning wastes the fertil Juices of the Land, as well as it abates the bad : And therefore is most proper for those Lands that have lain long untilled, and have contracted a fowre Juice, which causes the Land to run to unprofitable Trumpery ; as fowre Grass, Quitch, Rushes, Heath, Gorz, Fern, Broom, &c. and Land that runs too much to Straw, and yields but a lank short Ear, whether such Lands be hot or cold, wet or dry ; of all such Lands, burning is a very great Improvement, causing some poor Lands in two or three Years time to yield as much as the Inheritance is worth.

The usual Method of plowing of it is with the Breast-plough, which a Man shoves before him, made after the following Manner. At p is a little edge turned up, that cuts the Turf



off from the rest of the Green-sward, by means of which, when the Turf is cut about a Foot and a half long, they turn it over the cutting Iron, being about eight or nine Inches long. With this Plough they pare the Turf about half an Inch thick, except the Land is very full

full of Strings, Roots or combustible Matter; then, if 'tis pared thick, 'tis the better; which they turn over as they cut it, that it may dry the better: If it proves a dry Season, and the Weather hot, it will need no more turning; but if wet, they raise the Turfs and set them a little hollow. Some reer them on edge, and to make them stand, set them winding like the Motion of a Serpent's going, which gives opportunity to the Wind and Sun to dry both sides: When they are dry, they commonly lay about two Wheel-barrow's full to an heap: But the lesser the Hills are the better, provided there be enough to make such a Fire as will thoroughly consume the Heaps to Ashes. If the Turf be full of Roots, or have a good head on it, or if it be in a deep Soil, that you may cut it pretty deep, it will burn without the Addition of any other Fuel: If not, they raise their Heaps on a small bundle of Ling, Furz, Brakes, or such like Fuel, to set it on Fire. These Hills when burnt they let lie till they are a little sadned with the Rain, before they spread them; which they commonly do in a calm time, or after Rain, that the Wind may not carry away the Ashes, nor hinder the equal spreading of them, and they pare the Ground under the Hills somewhat lower than the Surface of the Earth to abate its over great Fertility occasioned by the Fires burning of it. This Land must be but shallow or half-plowed, not above an Inch below the depth of the Ashes, and not much above half the quantity of Corn you sow on other Lands sown on it, which they reckon best sowed late: If with Wheat, about the latter end of *October* is best, because of preventing the over-rankness of it.

These Lands they commonly cut the Turf off in *May* or any time in the beginning of Summer; but the sooner the better; because of having time to bring the Land into order. The Charge of cutting of the Turf, carrying of it on heaps, and burning of it, is commonly done for 24 s. *per Acre*, where Men have one Shilling and Two-pence *per day* for their Work.

In burning of the Turf you must take care not to over-burn it; 'tis only to be burnt so as may make it break and spread well; for the over-burning of it to white Ashes wastes the Nitrous Salt: And though the middle part of the Hills will be more burnt than the outside yet by keeping of the Fire from breaking out, and by laying of combustible Matter on the outside, you may fix the Salts in all parts of it, which is best done by a slow Fire.

Some stub up Furz, Broom, Heath, &c. and lay on heaps, and when dry, cover them with the Parings of the Earth, and burn them: others burn their Stubble on the Land, and others gather either Stubble or any other Trash they can get into Heaps, and burn them; and to every heap or hill of Ashes some put a peck of unslacked Lime, which they cover with the Ashes, and let it stand till Rain comes to slack the Lime, and then they spread the Ashes and Lime together. 'Tis observable of this sort of Improvement, that it tends most to the Increase of the Product; whereas other Manure, as that of Dung, &c. increases rather the Substance of the Straw, and breeds Weeds, than the quantity of the Grain or Fruit: Tho' I cannot but think, that if some Dung be laid on these Lands at the plowing of them up for a second or third Crop of Corn, which ought

to be the time for laying of them down for
Grass, that it will be of advantage to them, e-
specially if they are of the poorest sorts of
Lands.

Chap. III. *Of Chalk.*

CHalk is of two sorts, the hard dry strong
Chalk, which is the best for Lime; and a
soft unctuous Chalk, which is the best for
Lands, because it easily dissolves with Rain
and Frost. 'Tis a very great Improver of most
Lands, and will alter and change even the very
Nature of them, especially such as have not
been chalked before: For 'tis apt to cause Land
to put forth it self too much; and therefore
Land that is chalked, if 'tis not well dunged
and kept in heart, will receive but little benefit
from a second chalking, unless it lie a great
many Years to recover it self, or except it be
some very particular sort of Land, which is
the occasion of that Saying, That Chalk makes
a rich Tenant and a poor Landlord. For which
reason the best way of making Improvement
by it is to mix but one load of Chalk with two
or three load of Dung, Mud or fresh Earth,
which will make it a constant Advantage. 'Tis
best for cold, sowre Lands, and commonly
makes the greatest Improvement on those Lands
that lie farthest from it; because the Lands near
it partake and have too much of the Chalk
in them. They commonly lay twelve or
fourteen loads of Chalk upon an Acre, where
they lay it single, which will upon some Lands
cause extraordinary Crops of Corn for fourteen
or fifteen Years together. 'Tis best to carry

the Chalk on upon a Lay a Year or two before you plow it up, because by that means it will sweeten the Surface of the Earth, and work not so much downwards, as it will if plowed up at first. It makes Corn to yield well; and where 'tis laid upon Grass Ground, it will not so much increase the bulk of it, as it will make the Grass sweet, so as to cause the Cattle to fat speedily, and Cows to give thick Milk.

They have in *Kent* a pretty way of saving of Labour in the digging of Chalk, where they dig it upon the sides of Hills, by undermining the bottom of the Chalk, so far as they would have it fall, and upon the top so far as they have undermined the bottom, they dig a small Trench, which they fill with Water, which in about a Nights time will soak to the bottom, and cause a flake from top to bottom to fall the breadth of the place undermined, which saves a great deal of Labour and Danger. But as Chalk in most places lies a great depth under the Earth, they there commonly dig for it in the same manner as the Miners carry on the Shafts of their Mines, and draw it up with Buckets, in which places they commonly sell it for Six-pence or Four-pence a Cart-load, according as it lies in depth, where Men have one Shilling and Two-pence *per* Day for their Work, according to which Price I shall make all my Calculations.

Chap. IV. *Of Lime.*

LIME is commonly made of Chalk, or of any sort of Stone that is not sandy or very cold, as Free-stone, &c. All sorts of soft Stone,

Stone, especially a grey dirty-colour'd Stone, that if you break it, will yield a white Powder; and all sorts of Marble, Alabaster, Slate, Oyfter, and all sorts of Sea-shells, and all sorts of Flints, will make an extraordinary Lime; (but they are hard to burn, except in a Reverberatory Kiln, because they are apt to run to Glafs) for the harder the Chalk or the Stones are, the better is the Lime; only they require the more Fire to burn them: Both sorts may be burnt with Wood, Coals, Turf or Fern, which makes a very hot Fire. The Kilns used for Chalk or Stone they commonly make in a great Pit that is either round or Square, according as they have conveniency, and big according to the quantity they burn, which they make wide at the top, and narrow by degrees, as they come nearer to the bottom: The Inside of this Pit they line round about with a Wall built of Lime-stone; at the Outside near the bottom they have a Hole or Door by which they take out the Ashes, and above that some have an Iron-grate, which cometh close to the Wall round about; but others arch it over with Stone or large pieces of Chalk; and upon this they lay a Layer of Stone, or of what else they burn in the Kiln, and upon that a Lay of Wood or Coals, &c. which they repeat till the Kiln is full; only they observe, that the outmost Lay be always of Wood or Coals, or what they burn their Lime with, and not of what they make their Lime, to which they give fire at the Hole underneath. Chalk is commonly burnt in twenty four Hours, but Stone often takes up sixty Hours: Ten Bushels of Sea coal, or a hundred of Faggots three Foot long will burn forty Bushels of Chalk, and

forty Bushels of Chalk will yield thirty Bushels of unflaked Lime. Where Chalk is scarce, you may take the Chalk-rubbish and mix it with Water, working of it together as you do Clay for Bricks, which put into Brick-moulds, and drying of it, burn it; and it will make as good Lime as other Chalk. But the Stone-lime is much the best for Land, and indeed for all other Uses; which in many places they carry out upon the Land, and lay in heaps, allowing a Bushel to a Pole-square, or a hundred and sixty Bushels to an Acre, which they cover with Earth, letting of the heaps lie till the Rain slacks it, and then they spread it: But they reckon that if 'tis carried out upon the Land hot from the Kiln, that 'tis best; and that it doth best upon light sandy Land, or a mixed Gravel, and that wet or cold Gravel or Clay are not good for it. Dung, Mud, or fresh Earth mixed with it makes an extraordinary Manure, and is the best way of ordering of it for Land that is sandy or gravelly. I am told that a parcel of sandy Ground in *Westmorland* produced an extraordinary Crop of Barley and other Corn, being manured with Stone-lime and Cow-dung mixed together. The Nature of Lime is to work downwards like Chalk, and therefore 'tis best laying of it upon a Lay the Year before you design to plow it up. Lime is reckoned to make Corn grow with a thin Husk; but 'tis not a lasting Manure, it seldom holding above five Crops. Sir *Hugh Plat* says, that if Lime be laid on Land that has a Defect, it should be mixed with Dung; because the Rain, he says, will else wash away the virtue of the Lime; and if 'tis laid on the upper part of the Land, so as that it may wash down

to the
Lime
Land

M
marl
blue
Lime
very
marl
ther
ly d
Rive
fort
marl
a br
Hill
a lig
deep
and
quir
ly, C
near
time
marl
Pits
into
whic
piec
ligh
M
Mar
Mar

to the lower, it will do well; but Dung and Lime mixed together does much better on any Land than Lime alone.

Chap. V. Of Marle.

Marle is of several sorts. In *Cheeshire* they reckon six sorts. *First*, The Cow-shut-marle, which is of a brownish Colour, with blue Veins in it, and little lumps of Chalk or Lime-stone; 'tis found under stiff Clays, and is very hard to dig. *Secondly*, Stone Slate or Flag-marle, which is a kind of a soft Stone, or rather Slate of a blue or bluish Colour, that easily dissolves with Frost or Rain; 'tis found near Rivers and sides of Hills, and is a very lasting sort of Marle. *Thirdly*, Peat-marle or Delving-marle, which is close, strong, and very fat, of a brown Colour, and is found on the sides of Hills, and in wet or boggy Grounds, that have a light Sand in them about two foot or a yard deep; they reckon it the strongest of all Marles, and is very good for sandy Land, only it requires a double quantity to be laid on. *Fourthly*, Clay Marle, which resembles Clay, and is near a-kin to it, but is more fat, and is sometimes mixed with Chalk-stones. *Fifthly*, Steel-marle, which is commonly in the bottom of Pits that are dug, and is of it self apt to break into square cubical bits. *Sixthly*, Paper-marle, which lies near Coals, and like Leaves or pieces of brown Paper, only 'tis something lighter for Colour.

Mr. *Markham* reckons in *Sussex* four sorts of Marle, a Grey, a Blue, a Yellow, and a Red Marle; the Blue is reputed the best, the Yellow

next, and next the Grey; but the Red is less durable; the Goodness of which is not so much known by the Colour as the Purity and Un-compoundedness of it: For if it will break into bits like a Dye, or into thin Flakes, or is smooth like Lead-ore, and without any Composition of Gravel or Sand, if it will slack like Slate-stones, and shatter after wet, or being exposed to the Sun and Frost, will turn to Dust; or when thorough dry, will not hang or stick together like tough Clay, but is fat and tender, so as to open the Land 'tis laid on, and not to bind it, you need not question the benefit of it. In *Staffordshire* they esteem the Dice or Slate marle better than the Clay-marle, and reckon the Grey best for Pasture, and the Blue for arable Land. A great deal of the Marle in the North Country runs much upon the Loam; but that in *Sussex* is more like Fullers-earth; and therefore must certainly be the fattest. I reckon Marle much of the Nature of Chalk, and am told by a Potter, that whenever they meet with any Chalk, or any sort of Marle mixed with their Clay, though it will with the Clay hold burning, yet whenever any Water comes near any such Pots after they are burnt, that both the Chalk and Marle will slack and spoil their Ware. I saw a Sample of Marle from *Derbyshire* that was a very fat Marle, though it had so great a quantity of Sand in it, that it was so short, that if you wet it, you could not work it into a Ball, or make it hold together; this sort of Marle did very well upon Clay-lands, tho' contrary to the old Saying:

That

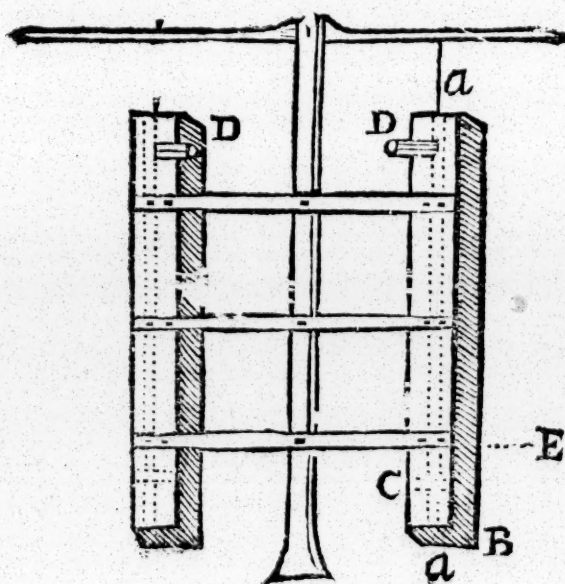
*That he that Marles Sand may buy Land,
He that Marles Moss shall suffer no Loss,
But he that Marles Clay flings all away.*

Because 'twas of a hotter Nature than commonly Marle is, and of a more opening Quality; Marle's binding and sadning of Land being the great Prejudice that it commonly doth to Claylands, as I said before: And tho' some Marle is fat, and something more opening than other sorts of it, yet the generality of it is of a cold Nature, and will be bound down by the weight of the Clay; and therefore commonly suits best with warm hot Lands. But as there are no general Rules without some exceptions; so where Marle is not laid too thick, nor is of a too tough binding cold quality, it will often mend Clays; especially Grazing-ground, as I shall shew hereafter: For in the suiting of the Land and Marle together, lies the chief advantage; and therefore the best and surest Rules to know the Richness and Profit of Marle by, is to try a Load or two upon each particular sort of Soil that you have, and in different Proportions.

Cow-shut or Stone-marle is commonly found under Clay, or low black Land seven or eight Foot deep. Clay and Steel-marle sometimes under sandy Land. 'Tis rare in Clays that it lies above a Yard deep, though under Sand 'tis much deeper: But the *Suffex* Marle commonly shews it self at the bottom, or on the middle of the sides of hanging Grounds.

For the digging of Marle they commonly use Pickaxes, Spades, Shovels and Wheel-barrows; and where the Pit is broad, that they
can

can make an easie Ascent, small Carts which are about four Foot and ten Inches long, two Foot three Inches wide, and fourteen Inches deep, made so as a load may easily be shot out of them. The Number of Carts must be proportionable to the Distance that the Marle is carried. They commonly have three, four, five or six Hewers or Diggers to four Fillers, being proportioned so as to keep the Fillers always at work: Besides, to each Cart must be a Driver and a Setter, whose Office is to shew where 'tis to be laid, and to assist in the unloading of it: Some sort of Marle requires a Carrier of Water to soften it for the Workmens Shovels; and if there be Springs, as there often are in the Slate-marle, there must be help to lade or pump it out, which often occasions a great increase of the Charge: For the easing of which I shall propose one of the cheapest and best Pumps that is for this Use; which is to



take

Take four Deals or other Boards, which joint and nail well together ; and if some Plates of Iron be nailed over the Edges of them, it will strengthen them much ; these Pumps may be made single with a common Pump-handle to them, for one Man to work them, or double for two Men, as in the Figure, *a a* shews the Cylinder of the Pump, which is all of a size quite through ; at the lower end at B is a Valve at the bottom where the Water enters, and to retain it when in ; at C is the Bucket fitted to the Cylinder of the Pump, with a Valve in the bottom of it, which opens and shuts as the Bucket is moved up or down ; so that the Bucket being let down to the Valve at B, it may raise the whole Column of Water in the Cylinder, and cause it to run out at DD ; the pricked Line at E shews how deep the Pump should stand in Water, which is to the top of the highest rise of the Bucket : These Boards may be of what length and breadth you please, according to the height you have occasion to raise the Water ; only you must note, that the longer the Pump is, the less the Cylinder should be, because of the weight of Water. One Man may work one of these Pumps that is twelve Foot long, and twelve Inches square, which will void a vast quantity of Water in an Hour, with a great deal of ease ; because the Motion is in Water without any sucking, which requires a much greater strength than the weight of the Water, which shews the Fault of the common Pumps in making of them of two different Bores, and of letting of the Bucket to work above the Water ; the ill Contrivance of which I have experienced in several Pumps, and particularly in one of sixty Foot deep,

deep, which I caused to be bored quite thro', four Inches and half Bore; the Bucket I let down to the bottom with Poles, which I grooved together and bound with small Iron-bands: The Poles I made almost the bigness of the Bore of the Pump, to ease the weight of the Water in the Cylinder, and it raised three times the Water with half the strength, when it was so altered, as it did before; and the Pumps so made are without those continual Repairs and Mendings, that the least Defects in Sucking-pumps are constantly requiring.

In *Lancashire* they use a sort of Sledge that is made with thick Wheels to bring their Marle out with, which are drawn with one Horse, that being the best way, where you have not Wood, Gravel, or other things to mend your Carting-place with, because 'tis not so heavy as a Cart, nor will they poach so much: But then they require more Drivers: And therefore where you can mend your coming out, the first sort of Cart is the best.

Marle is supposed to be fruitful from its salt and oily Quality. The Salt they reckon it contracts from the Air; and therefore some think that the longer 'tis exposed to it, the better; for which reason they esteem it best to lay it on Grass-ground three or four Years before they break it up, and when they cover their Land with Marle, not to plow above an Inch into the Soil, that they may not bury it, it being apt to work downward. But Mr. *Markham* is of a contrary Opinion, and is for having of it plowed in deep as soon as spread, because he says the Sun wastes the Fatness of it. I think him to be in the right, as to the ordering of the *Suffex* Marle, and the other in the right

right about the North Country Marle; because, as I said before, I think the *Sussex* Marle much the fattest, and that the way of ordering of Marle must be according to the Nature of it; for the finding out of which Experience is the best Master; and 'tis for the same reason that they lay Marle upon hard binding Lands in *Sussex* the beginning of Winter, and on ground of a contrary Nature in *Staffordshire* in *May* and *June*. Good Marle in hot Weather will slack with the heat of the Sun like Lime; especially if any Rain follow a hot day.

Some harrow the Marle in just before they plow it, which is a good way to mix it well and evenly with the Earth. Cole-feed, Hop, Clover, or any other sort of Grass-feed grow well on marled Land.

Some propose to know good Marle by putting of it in a Glass of Water, and if 'tis so tender, that as soon as it comes to the bottom the lumps break and dissolve, they esteem it good, else not; if it sparkle in the Water, and feel fat between the Fingers, 'tis reckon'd a good sign; but the surest is its dissolving with Wet or Frost.

Lands seated on Marle are usually very rich, although cold and heavy, and you need not doubt of the depth of the Soil; for the deeper you turn it up, and the more you expose it to the Air, the better. A mixture of light warm Soil also exceedingly helps it.

'Tis very necessary in marling of Land to find out the true Proportion that the Land requires; 'tis better to err by laying on too little than too much, because you may add more at pleasure. Marle doth not make so
great

great an Improvement on Land the first Year as afterwards.

Quantity.

In *Staffordshire* they lay two hundred Load upon an Acre, which they reckon the outside of what is to be laid, except 'tis upon a black, loose, or a sandy Mould, or a wormy Ground: On them they lay three or four hundred Load upon an Acre, and reckon they cannot be marled too much: Their common Observation is, that if 'tis a thin Mould, the Marle must be laid thin, and in a deep Mould thicker; tho' there are some Lands that Marle only improves by making an Addition to the depth of the Soil; and they reckon, that if they Marle an Acre of Land for twelve or fifteen Pound, that it will turn to good account.

'Tis best sowing of marled Land under Furrow; because if they are well husbanded, they will be mellow and hollow, which will occasion the Lands sinking from the Roots of the Corn if it stand too high; and the rougher these Lands are laid, the better; because the lumps will dissolve with the Frost, and moulder to pieces, and by their breaking help to cover the Roots of the Corn.

If Marle sadden Land, or make it stiff or binding, you must dung it well, and lay it down for Grass.

Where Lands lie upon the sides of Hills, the Water issuing out of them, is apt to carry the Fat of the Marle away, except you can marle the upper part, so as to have it wash down upon the lower; and therefore flat Lands are best for Marle.

These Lands should not be plowed when too wet, because 'tis apt to make them poach, and to breed Weeds, and 'tis good to plow them

them three or four Years, and then to lay them down three or four Years for Grass; for great care must be taken not to plow them out of heart; because after the Land is marled and laid down for Grass, if 'tis in heart, it may be improved by Marle again, after it hath been some years fed; but if not, it will never be improved by Marle again; and you must always observe, that when you design to lay down marled Land, to dung it well the last Crop; because it opens the Land, and makes it much more fruitful, especially in natural Grass, or Grass-seeds; and by this means Marle will last good thirty Years upon many sorts of Land.

In *Staffordshire*, after their Lands are marled, their way is to take the Crops following, *viz.* After the first Crop of Wheat is off, they plow in the Wheat Stubble in *December*; and if the Weather prove frosty to mellow it, they do not plow it again till *April*; when they sow it with Barley, allowing three Bushels to an Acre. Its common Produce is thirty Bushels. After Barley they sow Pease, for which they plow but once in *February* following, allowing three Bushels to an Acre; and next after Pease, (if they intend six Crops) they sow Wheat again upon the Pease Crop; the fifth Crop is Barley again; and for the sixth Years Crop red Oats: Some sow two or three Crops more when the Land is well marled, but 'tis better let alone.

Mr. *Markham* mentions four sorts of Land in the Weald of *Kent* and *Sussex* improved by Marle. 1. A hazel Mould, which he advises to be plowed up as deep as it may be, even to the dead Earth, and to lay five hundred of the small Cart-loads of Marle upon an Acre: This
Land

Land they sow with Oats upon a Laye to kill the Grafs; or they marle it in *May*, and sow it with Wheat, giving of it a Summer-fallowing first, and the next Year sow it with Pease, sowing of them early, and then with Wheat again, if 'tis a moist Summer; but if dry, they fallow it again first, allowing two Bushels of Wheat upon an Acre, which is the outside of what he would have sown: Because if you sow it thick, it will be small, and the Straw slender, which the Wind will be apt to beat down. In *February* he would have the Wheat fed with Sheep, which will trample the Earth the closer to the Roots of the Corn: After which, if you roll it, he reckons it will be of advantage to it; and after the taking off two Crops of Wheat, his Advice is to lay it down for Grafs five or six Years: And if it grow mossy or broomy, which these Lands are inclined to, then to break it up again, and to order it as you did before, laying of it down again from the Wheat-stubble. And thus being interchangeably sowed and rested, it will last good thirty Years: Whereas if the productive Fat of the Marle be spent by often sowing of it, and exposing of it to the Sun and Air, it will remain a dead Clod that is not capable of being mended with new Marle.

2. Marle Cope-ground, which is commonly a cold, stiff, wet Clay, and not so proper to be marled for Corn, (except black Oats) unless in some places where 'tis very fleet for Pasture. Those Lands must be plowed fleet, lest the Marle be drowned with the Wet. Where you have good Drains, and that the Clay lies any thing dry, it may be sowed with Wheat. Three hundred load of Marle upon

upon an Acre of this Land he reckons sufficient, and that two Bushels and a half of Wheat will sow it, which must be sowed above Furrow fourteen or twenty Days before *Michaelmas*, and should be laid up in round high warm Ridges. These Lands must be well mended with Dung and dry Earth; the Charge of which I cannot think will answer, especially if marled with *Suffex* Marle; and therefore I think their best Improvement is for Grass, which Marle will make very sweet for eight or ten Years, till the Marle is sunk so low, that another crust of Earth is grown over it; and then it may be plowed up: But it must be done but fleet, and but a Crop or two of Corn taken from it, and then be laid down for Grass again. These Lands, when fallowed, must be fallowed very dry.

3. Sandy and gravelly Grounds, which are to be ordered much as the hazely, save only in that more Marle may be laid on them, and that they must not be so often plowed. 'Tis best to plow these Lands pretty deep, that the more Marle may be laid on them. They commonly allow five or six hundred loads to an Acre of these Lands, which they sow always under Furrow about *Michaelmas*, allowing two Bushels and a half of Wheat to an Acre, and leave it as cloddy as they can; and after they have taken a Crop from them they fallow them, and sow them with Wheat again, for they do not reckon them rich enough as yet to bear good Pease. This done, they let them rest four or five Years. If they run over with Broom, they cut or pull it up, and after that sow it with Oats; the next Year they fallow it, and lay three or four hundred load of Marle

upon it, and order it as the hazely Ground, and it will mend them for thirty Years. Where either the sandy or gravelly Lands are springy or wet, he advises rather to marle them for Grafs than Corn, and to lay five hundred load of Marle upon an Acre. Some propose to burn Marle, and then to lay it on the Land; and that where they do so, sixty load will go as far as three hundred load not burnt; but they do not mention the sort of Land 'tis to be laid on, nor of what sort the Marle is. I have inserted these several ways of managing of marled Land, that so every one may make a particular Application of each way to Land of the same Nature; and that (if any do know of any different sorts of Land, or different sorts of Marle that are ordered after any other way) they will communicate their Observations about them to the Printer hereof.

Chap. VI. *Of Fullers-earth.*

Fullers-earth is of a very fat Nature, and is very full of that vegetative Salt that helps the growth of Plants, which appears in its cleansing scowring Quality; and though 'tis not much used for the Improvement of Land, because of the Profit it otherwise yields, and because it may not so universally suit a great many sorts of Land, as Marle doth; yet I cannot but think that it must be a very great Improver of some sorts of Land; and of this Mind I find Sir *Hugh Plat*, Mr. *Markham*, and others.

Chap. VII. *Of Clay.*

ALL sorts of Clays are a very great Improvement of gravelly and sandy Land, by allaying of their Heat, and making of them more solid and tenacious, and more constant in the Produce of their Crops, and prevents their being spoiled with every uncertainty of the Season, altering and changing the very Nature thereof, as I told you before: For, as Mr. *Bernhard* affirms, even Marle it self is a kind of Clay that is become fatter, and of a more enriching Quality by a better Fermentation, and by its lying so deep in the Earth as not to spend or weaken its Fertility by any Product, which we find it will do when too much exposed: And therefore Clays that lie the deepest must be best for this use. However, Experience and Trial will satisfy every one the best in these sorts of Experiments, and the Cost of the Trial will be but small; and so there can be no great Hazard, if there is not a certain Gain. But you have an instance of Clays improving of sandy Land at *Tollethorp, Tollerton, &c.* in the North-riding of *Torkshire*, which Town standing upon a light sandy Soil, they improve it by Clay that they dig hard by in the declivity of a Hill, after having bared away about two yards deep of Sand. The Clay is of a blueish brown Colour, and is close, fat and ponderous, and burns well for Bricks. They lay an hundred load upon an Acre, which they lay on about Midsummer. They observe, that for three or four Years after 'tis laid on the Land, that it continues in Clods, and

that the first Year the Land so manured beareth a rank ill-colour'd broad-grain'd Barley, but afterwards a plump, round Corn like Wheat. This Clay-manuring lasts forty or fifty Years, and then the Ground must be clayed again. Note, that this sandy Land, unless clayed, will bear nothing but Rye, whatever other Manure they use to it; but being once clayed, it bears Oats, Barley, Peas, &c.

Chap. VIII. *Of Sand.*

AND as Clays are an Improvement to Sand, so Sand by the same reason is an advantage to cold Clays, in that it warms them, and unlocks their binding Quality. As for Sands found on the Earth, the best is that which is washed out of Highways, or from Hills or sandy Places, by the Violence of the Rains, or that which lies in Rivers: The common Sand that is dug out of the Earth having but little Fertility in it; only by way of Contraction to Clay-Grounds, they may effect much. This *Columella* confirms, and Mr. *Blith* adviseth for the increasing of Soil in Winter, where you cannot fold Sheep, to have a Sheep-house to feed them in, into which he would have you bring twice a Week several loads of Sand out of the Highways, Streets or Sand-pits; which by the Fatness of the Sheeps-dung and Urine, will make an excellent Manure for cold Clay-lands; the same will Sand make that is mingled with any sort of Dung.

An Account from Mr. *John Edmonds* of *Bowden* in *Cheshire*, of his improving of Land by Sand.

“ His Land, he says, was Marsh-land, very
“ flat and full of Ruthes, of a black deep
“ Mould, such as they dig Turf in ; upon
“ which Land he laid six hundred Cart-load of
“ Sand upon a *Cheshire* Acre, which is near
“ double the Statute Acre : This Sand is digged
“ on *Bowden Downs*, which is a red hot Sand of
“ a small Grain, lying under a sandy Soil of
“ about a spit deep, that bears nothing but
“ Fern and a short Grass which burns away in
“ Summer, being good Busk-wheat Land ; and
“ laying of the Sand so thick, without plow-
“ ing of the Land up, he sowed it with Oats
“ and Fitches, which yielded an extraordinary
“ Crop. The next Winter he dunged it well
“ with Dung, and had the Summer after four-
“ teen loads of Hay upon an Acre. ’Tis now,
“ he says, twenty four Years since he sanded
“ it first, and he has not dunged it since ; and
“ the Land that before was not worth ten Shil-
“ lings an Acre, he can now let for six Pounds,
“ and could have two Crops of Grass upon it
“ every Year, if he could be sure of fair Wea-
“ ther to make it in.

“ He says likewise, that he improved some
“ of the same sort of Land by plowing of it up
“ with a Breast-plough, and burning of it, and
“ spreading of the Ashes while hot, and plow-
“ ing of them up, and sowing of them as soon
“ as possibly he could. This Land he sowed
“ twice with Barley, and the third Year with
“ Oats, and then it was so soft that he could

“ not plow it any more, which obliged him to
 “ lay it down ; and he had extraordinary Grass
 “ on it for three or four Years, and then it
 “ began to run over with Rushes again, which
 “ occasion'd him to repeat burning of it again,
 “ and it had the same effect as before.

“ He says also, that in their Country many
 “ make very great Improvement of their
 “ Lands, by laying on them the Crumbs which
 “ are scattered in digging of the Turf that they
 “ burn, which is very good for all sorts of
 “ binding Clay Lands, especially such as are
 “ over-sadned with Marle ; and the Land
 “ which, he says, they dig for Turf, is ex-
 “ traordinary Land for Potatoes.

“ This way of improving of this sort of
 “ Land is confirm'd by Mr. King, in the Trans-
 “ actions of the Royal Society, N^o 170. p. 948.
 “ who says, that in *Ireland* the boggy Lands,
 “ when drained, are very much improved by
 “ burning, and laying of fresh Earth on them ;
 “ but what makes the greatest Improvement,
 “ is Sand or Gravel : especially the latter.

“ Where they burn Turf, which they dig in
 “ heathy Commons, they reckon five hundred of
 “ Turf a load, which they cut for 8 s. a hundred.

“ The Ashes of these Turfs are an extraor-
 “ dinary Improvement of almost any sort of
 “ Land.

Chap. IX. *Of Earth.*

AS Marle, Clay and Sand properly applied
 make great Improvements ; so do parti-
 cular sorts of Earths, as all sorts of a saltish
 Nature, the black Moulds that lie in low Mea-
 dows, and Mud of Ponds and Rivers, especial-
 ly

ly if mixed with Dung, are a great Improvement of gravelly and sandy Grounds, or any dry Up-lands, and so is Earth covered with Hovels or Houses, especially such as have any Salt-peter in them: Or if they have been used for the folding of Sheep in, as is commonly practised in *Flanders*, according to the Way before mentioned of Sand; or if mixed with Lime or any fat Substance, or the Dung of Beasts, Fowls, &c. especially if they are cast up to ferment together sometime, or be cast into low Places, that the Moisture of Dung washes into, which will not only improve the Earth, but moderate the heat of the Dung, and make it a greater Improvement of hot Grounds, especially for Pasture, and increase the Quantity of both Dung and Earth, which it concerns every Husbandman to do as much as he can; because in the quantity of his Manure consists the chief of his Profit; which Sir *Richard Weston* confirms in his Legacy, who says, that in *Flanders* in their Houses where they fold their Sheep, that by putting of Earth and Sand to mix with the Sheeps Urine and Dung, they do of three or four hundred Sheep raise a thousand load of Dung in a Year, and that this Manure is an extraordinary Improver of sandy Land.

Chap. X. *Of Sea-Sand.*

THE richest of all Sand is what comes from the Sea-coast and Creeks, of which they make very great advantage in the West Country; the chief Vertue of which some reckon to consist in its Saltness, and others in the Fat and Filth that the Sea gathers from the

Land floods, the Shores, the Fish, and things that putrifie in the Sea. I am apt to think that it proceeds from both, and that there is a third thing that contributes to its Vertue as much as any thing, and that is the Fish-shells that are commonly mixed with it, which the working of the Sea breaks as finall as the Sand it self; for the fuller the Sand is of these broken Shells, they reckon it the better: Sea-shells of any sort being very great Improvers of Land; especially such as is sowre or cold; but where they are not broke to pieces by the working of the Sea, 'tis good to break them with an Iron Stamper, or rather with such a Mill as they break Apples with; or else, which I think the better way, to calcine them, so as not to make Lime of them, but to give them such a heat as may cause them to moulder and fall to pieces with the Rain and Frost; because they are a long time else before they will dissolve, especially if they are of a hard strong sort, such as Oyster-shells, &c.

The Sand used for Land is of three Colours: That about *Plymouth* and the Southern Coasts is of a blue or grey Colour like Ashes, which some reckon to proceed from the breaking of the Muscles and Oyster-shells mixed with it. Westward, near the Lands end, the Sand is very white, and in *Scilly* glistering, which may be occasioned from the mouldering of Moor-stones, or a kind of Free-stone mingled with white scallop Shells. On the North Sea from about *Padstow*, and Eastward to *Lundy*, the Sand is of a brown, reddish, yellowish Colour, and is composed mostly of broken Cockle-shells. In *Falmouth* near St. Maw's Castle, there is a sort of Sand, or rather Coralline, that lies un-

der

der the *Owse*, which they are forced to remove before they can come to the Bed of Sand. That Sand is reckoned the best that is of a red Colour, the blue next, and the white worst; the Sand taken up by dredges from under the salt Water, or that is left open by the ebbing of the Tide, and the Sand that is of the largest Grain is the best; though the small-grained Sand is esteemed the best for the Tenant, who only takes three or four Crops; and the large for the Landlord and the Land, because it abides longer in the Ground, and makes the Pasture afterwards the better. If the Sand be well drained of salt Water, so as it may conveniently be carried, they reckon it better than if it lie too long in the Wind and Sun. Where the Sand is dredged out of the Sea, a Lyghter-load that contains about twelve Tun, costs twelve or thirteen Shillings; where 'tis got from a dry Beech after an Ebb, it is not worth above four Shillings the Lyghter. Where the Sand is near, they lay about sixteen Tun upon an Acre; where they can go three times a day, they lay about ten Tun; where twice a day, five Tun; and where but once, two or three Tun: And in some places but one Tun, where the distance is great.

As soon as 'tis brought home they spread it on the Ground, from which they commonly take four Crops of Corn, and then lay the Land down for Pasture for six or seven Years before they plow it up again; the Grasse will be so good, that they commonly mow it the first Year; it runs most to white Honey-suckle or Clover, and though in some Lands the Grasse is but short, yet it yields great plenty of Milk and Cream, fats Cattle exceedingly, and mends
Garden

Garden Herbs and Fruits, making the Corn to have a large Ear, and a short Straw, so that sometimes the Ear of Barley is very near as long as the Stalk : But where little Sand is used there is much Straw, and not so much Grain. In well-fanded Lands little or no Snow lies, but there is a continual Spring, even in the midst of Winter, and the Harvelt is commonly a Month or six Weeks sooner than in other places, and 'tis reckoned to agree with any sort of Land whatsoever.

In *Cornwal* is a Weed called Ore-weed, which grows upon Rocks under the High-water Mark, and some is broken from the bottom of the Sea by rough Weather, and cast upon the shore by the Winds and Floods, with which they improve their Barley-lands.

Snail-cod or Snag-gret lieth frequently in deep Rivers, and is full of little Shells ; one load of which is reckoned as good as three load of Dung.

All Manner of Sea-Owse or Owse Mud, and the Mud of Rivers, Lakes, or the bottom of Ditches, the wash of Pastures, Fields, Commons, Roads, Streets or Backsides in any place where the Water meets with rest, or that Rain-water hath a long time settled, or that Sinks run into, are of very great advantage to all sorts of Land, especially dry Gravels or Sand, that are mixed with Dung.

In *Newfoundland* they improve their Ground with the Garbish of Filh ; and there is no doubt but that most things that belong either to the Sea or Waters may be of advantage to the Husbandman, if judiciously used ; because they are the Receptacle of the Fat that is washed from the Lands.

An

An Account of the way of manuring of Lands with Sea-shells, as practis'd in the Counties of *Londonderry* and *Donnegal* in *Ireland*, by his Grace the Lord Archbishop of *Dublin*, communicated to the Royal Society, by *Samuel Molineux*, Esq;

Both these Counties are very mountainous, and those Mountains cover'd with Bogs and Heaths, insomuch that there is very little Arable Ground in them, except what has lately been made so. There are three ways practis'd to reduce Heath and Bogs to Arable Land. The first is by *Burn-bating* of the Land, which being plowed three Years, bears Barley, Rye and Oats; which sort of Husbandry, as his Grace observes, defiles the Air, causeth Rain and Wind, and by destroying the Sap of the Earth, and Roots of the Grass, and all other Vegetables, renders it useless for several Years after the third, in which it was plowed.

The second way is by *Liming*. This is much better than the former, because it does not so much depauperate; the Ground will last long, and beareth larger Grain, and whatever is pretended, doth not destroy the Grass, if due care be taken not to over-plow it; but then 'tis very dear, and Lime-stone is not every where to be had, and in many places Fuel is wanting.

Marle is not used that I have observed in the North, but about the Sea-side the great Manure is Shells. Any one that will look into the Map will see how the Bay of *Londonderry*, commonly call'd *Loughfoil*, lies: Towards the Eastern Parts of it there lie several Eminences that

that hardly appear at low Water. These are made of Shells of Sea-Fish of all sorts, more particularly of Periwinkles, Cockles, Limpets, &c. The Countrymen come with Boats, and carry loads of these Shells away. They leave them on heaps on the Shore, and there let them lie till they drain dry, and by that means become lighter for Carriage. They carry them in Boats as far as the Rivers will allow them, and then in Sacks on Horses, perhaps six or seven Miles up into the Country. They allow sometimes forty, but mostly eighty Barrels to an Acre. They agree with boggy, heathy, clayie, wet or stiff Land, but not with sandy. They seem to give the Land a sort of Ferment, as Yeast doth to Bread, opening and loosening of the Clods, and by that means making way for the Roots to penetrate, and the moisture to enter into the Fibres of the Roots. This Manure continues so long, that I could find none that could determine the time of its enduring,

The reason of its long continuance seems to be this, that the Shells melt every Year a little, till they be all spent, which requires a considerable time; whereas Lime, &c. operates all in a manner at once; but it's to be observ'd, that in six or seven Years the Ground grows so mellow that the Corn that grows on it can't support it self, and the Land must be suffer'd to lie a Year or two, that the Ferment may be a little quieted, and the Clods harden, and then it will bear as long again; and for ought I could know or find, it continues to do so with the like Intermission for twenty or thirty Years.

In the Years that the Land is not plowed, it bears a fine Grass, mixed with Daisies in abundance; and it is pleasant to see a steep high Moun-

Mountain that a few Years before was all black with Heath, on a sudden look white with Daisies and other Flowers.

It fines the Grass, but makes it short, tho' thick, and observing that this Manure produc'd Flowers in the Field, I made my Gard'ner try these Shells in my Flower-Garden; and I never saw better Carnations or Flowers, nor fairer or larger than in that cold Climate, and it contributes to destroy Weeds, at least does not produce them so much as Dung. It likewise produces very good Potatoes at about a Foot distance from one another. This is one of the Methods of reducing of barren boggy Land: they lay a little Dung or Straw on the Land, and sprinkle it with Shells: Sometimes they cut the Potatoes, if large, that they may go the farther, and then dig Trenches about six or seven foot distance, and throw the Earth or Soil they take out of them on the Potatoes, so as to cover them, and then fencing the Plat of Ground so planted, let them grow. They plant them in *April* or *May*, and in *August* they are ripe, when they dig them as they have occasion for them; and let them lie till next Year, when they dig them again, and so the third Year. And by this means they every Year go deeper in the Earth, till they dig up the Land, and pick them out as carefully as they can; the fourth Year they plow the Ground, and sow it with Barley, and the Produce is very good for some Years. Some Potatoes will remain and grow up, without any harm to the Earley or Oats, and those they dig and pick out, and the Ground remains good and arable always after.

'Tis

'Tis observable, that Shells do best on boggy Ground where the Surface is Turf. Turf being generally there nothing but the produce of Vegetables, such as Grass, Heath, &c. that being rotten, the Salt is washed away by the Water, and there remains only the earthy, and especially the sulphureous parts of them, as appears from the Inflammability of Turf. Now Shells being chiefly a Salt, it incorporates with the Sulphur of the Plants, and renders them fit for the Vegetation of new Plants. And this appears further from this, that Shells that have been under the salt Water are much better than such as have been in the Earth, or dry on the Sands. Almost all about the Bay of *Londonderry*, if you dig a Foot or two it yields Shells, and whole Banks are made up of them; but these, tho' more intire than such as are brought out of the Shell-Island, are not so preferable for Manure.

I observed at a place near *Newton Lamavady*, about two Miles from the Sea, a bed of Shells such as lie on the Strand, the place was cover'd with a scurf of wet spewy Earth about a Foot thick. The Country People used the Shells, but they were not so good as those that are found in the Sea, or near it.

The Land about the Sea-side bears very indifferent Wheat, nor will the Shells in that particular help it without some Dung; but I very much doubt whether that be not due to the Ignorance of the Farmer that generally understands nothing of Wheat.

Some thousands of Acres have been improved by Shells, and that which was not worth formerly a Groat an Acre, is now worth four Shillings. They have, in many Places, thus

im

improv'd the very Mountains, that before were only Turf-bogs. In these they meet with this Inconveniency, that if the Season for plowing prove wet, their Horses sink so deep in the Soil that they can't plow it, especially after two or three Years.

They commonly made Lime of the Shells formerly, and some do so still: I have not, that I remember, seen any such Lime, but I understood that it bound very well, and I believe 'tis not so corrosive as Lime made of Stone. For I find in the History of *Ceylon*, that they make up their Land with Lime of Oyfter-shells, which I believe would be impracticable with common Lime.

About thirty Years ago they made Lime of the Shells to manure their Lands with, but a poor Countryman, out of Laziness or Poverty, had not provided to make Lime, and threw the Shells unburnt on his Land, and his Crop proved as good as his Neighbours; and the second and third Crop better, and all took the hint, and have us'd them so ever since.

When Shells are not to be procured, Sea Wreck (that is *Alga Marina*) or Sand, supply the want of them, but are not so good; Sea Wreck lasts but three Years, and Sand but little longer.

'Tis certain, *Ireland* has been better inhabited than it is at present; Mountains that are now cover'd with Bogs, have formerly been plow'd Land; for when you dig five or six foot deep, you discover a proper Soil for Vegetables, and find it plowed into Ridges and Furrows. This is observable in the wild Mountains between *Armagh* and *Dundalk*, where the Redoubt is built, and likewise on the Mountains of *Alt-*

more.

more. The same, as I am inform'd, has been observ'd in the Counties of *Londonderry* and *Donnegal*; a Plough^h was found in a very deep Bog in the latter, and a Hedge wattled standing under a Bog that was five or six foot above it. I have seen the stump of a large Tree in a Bog ten foot deep at *Castle Forbes*; the Trunk had been burnt, and some of the Cynders and Ashes lay still on the stump. I have seen likewise large old Oaks grow on Land that had the remains of Ridges and Furrows. And I am told that on the top of an high Mountain in the North, there are yet remaining the Streets and Foundations of a large Town; and in truth, there are few places but either visibly, or when the Bog is removed, in which there do not remain marks of the Plough, which must prove the Country well inhabited. 'Tis likely that the *Danes* first, and then the *English*, destroy'd the People; and the old Woods seem to those that pretend to be Judges, to be about three or four hundred Years old, which was near the time that *Courcey* and the *English* subdued the North of *Ireland*, and 'tis likely made havock of the People that remain'd after the *Danes* were beat out of *Ireland*.

Concerning what his Grace mentions of improving of Land by Sea-shells that come out of the Sea-water, as being the best I am confirm'd in by what I am inform'd of from *Scarborough Castle*, which standing upon a high Clift of Lime stone, many Stones are broke off from it by the Violence of the Sea, which the Inhabitants thereabouts burn to Lime, to improve their Land with; and they always observe, that Lime made of such Stones as come out of

the

the
tha
M
Isla
serv
scow
than
burn
for
says
Tori

H
being
their
serve
ture
for h
very
Winte
Dung
laid a
exhali
ing a
of it;
best ti
Winte
Groun
posed
to dur
by cal
fill it
nure o
VO

the Sea-water improves the Land much better than the Lime made of such Stones as are dry.

Mr. *Martin* in his Description of the *Scotch* Islands, says, that the Ashes of Sea-weeds preserve Cheese instead of Salt, and that they scower flaxen Thread better, and make it whiter than any thing else; and that the Sea-weeds burnt to Ashes is the best Manure they have for their Lands: And in the Isles of *Orkney* he says they dress their Leather with Roots of *Tormentil* instead of Bark.

Chap. XI. *Of Dungs.*

HOrse and Cow-dung are the most common sort of Dungs, by reason of those Cattle being the most kept up; upon which account their Soil is with the most Conveniency preserved. Horse-dung being of the hottest Nature is best for cold Lands, and Cow-dung for hot Land; or mixed together they make a very good Manure for any sort of Land. In Winter-time, or when any Rains come, your Dung ought to be turned up on Heaps, and laid as thick as you can to prevent the Sun's exhaling the Virtue of it, and the Rains washing away its Fatness, and the Nitrous Quality of it; and to beget the better Ferment in it, the best time to carry Dung on upon Lands is in Winter, that the Showers may wash it into the Ground; and because it will then be least exposed to the Sun. If the Land that you design to dung lie in small Ridges, split your Ridges by casting of two Ridges into the Furrow to fill it up, and so lay your Dung or other Manure on: Or which is better, plow three Fur-

rows to one, that so you may lay your Manure upon the top of the Land, and not bury it too deep. But where Dung is to be laid on a Summers-fallow, 'tis best to be done just before you twy-fallow, observing not to spread your Heaps, till just you are ready to plow the Dung in; that so casting of it under Furrow, you may turn the Ridge over it, so as to cover it from the heat and drought of the Summer-Sun and Wind till you try-fallow it, at which time you may raise it again, and so turn the Dung up that was buried before. But many find fault with the dunging of Corn-land, and say, that it causes Weeds; and therefore in some places to prevent that Inconveniency, they let their Dung lie till 'tis turned to Mould, by which means half the Vertue of the Dung is lost; for one load of new Dung for Corn-land is worth two of old: Whereas the occasion of their Lands being subject to Weeds is, First from the natural Quality of it, and, Secondly from their laying too great a quantity of Dung on them at once, many often laying forty or fifty load upon an Acre; whereas the greatest quantity that should be laid upon Clay-lands, if sown with Corn, (which are the best Lands to bear Dung) ought not to be above twenty load upon an Acre, and the red hazely Brick-earth or light Sands, that are subject to Weeds, and that spend themselves in producing of Straw rather than Grain; ten or fifteen load upon an Acre is enough at a time, because by that means you may be often dunging of them, and renewing of their Surface with fresh Dung: For in two or three Crops they will eat out the Vertue of any quantity of Dung that is laid on them, and too much Dung

doth

dot
Co
Bar
But
cau
mix
bate
and
any
upo
load
'tis
quan
For
Dun
the c
impr
of C
Dun
upon
much
of fo
hand
they
Wint
to an
and
your
in br
and n

T
gather

doth but increase their Rankness: But the best Corn that you can dung these Lands for, is Barley, which delights in a well-dunged Soil: But then it doth best upon an Etch-Crop; because the fallowing of it the next Year will mix the Dung and Earth together, and will abate something of the strength of the Dung, and prepare the Land the best for Wheat of any way, as I have often experienced. Indeed upon gravelly or sandy Land thirty or forty load may be laid upon an Acre or more, if 'tis a fleet Soil, and that 'tis mixed with a great quantity of Earth, Marle, Mud or Clay, &c. For by that means you not only qualifie the Dung and mend the Land, but you increase the depth of the Soil, which is the best way of improving of these sorts of Lands, or any sort of Grass-grounds, as I said before: But clean Dung is best for Barley; and if Dung be laid upon Land sometime before 'tis sowed, 'tis much better than to lay it on just at the time of sowing; and the longer 'tis laid on beforehand the better. Therefore in *Northamptonshire* they always spread their Dung betimes in the Winter, and the proportion to guess at 20 load to an Acre, is to make four heaps of a load, and where your Land is in small Ridges, lay your heap on each tenth Ridge; and where 'tis in broad, lay your heaps on each third Ridge, and make five heaps of a load.

Chap. XII. Of Sheeps-dung.

THis is the best of all Dung, especially for cold Clays; which not being so conveniently gathered together as other Dung, is commonly

conveyed upon the Land by folding of the Sheep themselves upon it; by which means both the Urine and Dung too is saved, which ought as soon as possible to be turned in with the Plough, that it may not be exposed to the heat of the Sun. In *Northamptonshire* they think it best to fold Sheep after *July*, and to fold them upon dry Land the latest. But the best Improvement of Sheeps-dung is to fold them in a covered Fold, and to mix their Dung with Earth, Sand, &c. as is before mentioned.

I have known vast Crops of Rye upon barren Lands that have been old Warrens, and well-dunged with Rabbits.

Chap. XIII. *Of Hogs-dung.*

NEXT to that of Sheep, I prefer Hogs-dung, as one of the fattest and most beneficial of all sorts of Dung, one load of which will go as far as two loads of other Dung; which might be an occasion of the ancients mistake about its being a breeder of Weeds, because of their laying of it too thick, which (as I observed before) any Dung will do. 'Tis a very rich Dung both for Corn and Grass, especially the latter, and for any sort of Land, but the best of all Dungs for Trees; and therefore many good Husbandmen prefer it before most ordinary sorts of Manure, and take great care not only to have their Hogs Coat well pailed, and paved with Pebbles or other Stones, or, where 'tis to be had, with Chalk, which is much the best, and is thereby much advantaged for the Land; but also to increase the quantity of the Dung as much as they can by casting

casting into the Coat all the Straw, Beans, Roots, Plants, Weeds, &c. out of the Garden before they are full of Seeds, Fern, and other Trumpery, which is not only very good for the Hogs, but some have increased the Dung, so that out of a small Hog-coat sixty or eighty load of Dung hath been raised in a Year. I think the best way of ordering of this sort of Dung, is to mix it with Horse-dung, for which reason I am for placing of my Hog-coat as near my Horse-dunghill as I can with Convenience.

In *Staffordshire* on poor light shallow Land some sow a small white Pea which they never reap, but turn in so many Hogs to eat them as they think they will fat, and there they let them lie Day and Night, and their Dung will so enrich the Land, that it will bring a good Sward upon it, and graze well many Years afterwards.

Chap. XIV. *Of Urine.*

Urine by *Glauber* is reckoned to be of a destructive, mortifying Nature to Vegetables, because of the Sal-armoniacal Quality that is in it; but 'tis an indiscreet Use of it by the Application of too great a quantity that makes it so, and even Dung it self will have the same effect for a time where 'tis laid too thick. There is nothing that will improve Land, nor increase the strength of Manure, nor help the Fermentation of Dung more than Urine will do: For which reason in *Holland* they are as careful to preserve the Urine of their Beasts, as their Dung; and Mr. *Hartlib*

in his Legacy commends it as a very great Improver of Land.

Chap. XV. Of Humane Ordure.

A Gentleman that had a very hot dry burning piece of Land that lay expos'd to the heat of the Sun, had a mind to make a Vineyard of it, but could never get his Vines to grow till he manured it with Humane Ordure; for the saving of which he is so careful as to have Boxes with long handles to them to save it in. I know also of incredible Advantages made by it on Land in *Kent*, which I cannot yet get the Particulars of, because of the Party's Decease. Humane Ordure is of all sorts of Dung the greatest Improver of Land, especially if mixed with other Dung, Straw or Earth, to give it a Fermentation, and to render it convenient for Carriage, and sells in Foreign Parts at a much greater Rate than any other sort of Manure.

Chap. XVI. Of the Dung of Fowls.

I Shall begin with Pigeons-dung, as being the most experienced, forty Bushels of which will manure an Acre of Land, and therefore is very convenient where Land lieth at a distance, and where other Manure cannot conveniently be carried. 'Tis best for Barley or Wheat, and on cold Lands, it being a very hot Dung: The common way of ordering of it is to sow it by hand after the Grain is sowed, and in the same manner as they sow Corn, and so to harrow it

in with the Seed: For one Crop this often makes a very good increafe.

Hens-dung is a very rich Dung, but because of its hanging together, 'tis not so easie to sow as Pigeons-dung; so that you cannot well tell how to give the Land a due proportion, but either it will be too thick or too thin; and therefore 'tis best mixing of it with other Dung, or with the Ash-heap, or with Earth or Sand.

Goose-dung by the Ancients has been esteemed very hurtful and prejudicial both to Corn and Grass, and is so esteemed by many now, and very unhealthful for Cattle. Indeed in long Grass that is ready to mow, or in Corn they will do Mischief by treading of it down with their Feet, and eating of it; but for their Dung it's as good both for Corn and Grass as the Dung of any Fowl whatsoever, as hath been experienced by many. 'Tis much of the same Nature with Hens-dung; and as for the wholesomeness of it, at *Sutton in Nottinghamshire* is a Field that was given to the Town for a Goose-pasture, whose Dung hath made it (I think) one of the richest pieces of Pasture that I have seen, and as it lies open in a common Field, I have often observed that all sorts of Cattle covet much to feed on it; nor could I find by any of the Inhabitants that Cattle feeding on it receive any prejudice from it. I have likewise a small Pasture by my House, on which my Geese lie very much, that I keep a Horse in, who, I find, eats the Grass barest where they have dunged most; nor could I find that ever it did him any injury, except it made him too fat. Besides, their Dung is used in several Medicines both for Cows and Horses. Pigeons-dung and the Dung of other Fowl is the best

Manure for Fig-trees, Asparagus, Strawberries, or any sort of Flowers. And Dr. *Leigh* in his Natural History of *Lancashire* and *Cheshire*, p. 56. gives an account of *Fowley Island* which is so improved by the Dung of Fowls, that it fatts Sheep in a very short time worth 50 s. or 3 l. a-piece.

Chap. XVII. *Of several other Soils and Manures.*

Ashes of all sorts contain in them a very rich fertil Salt, and are the best Manure of any to lay upon cold or wet Lands, especially if kept dry, that the Rain doth not wash away their Salt. One load of dry Ashes will go as far as two load not kept so. But as Rain-water diminishes their Salt, so the moistning of them with Chamber-lee or Soap-suds will add mightily to their strength, as I have often experienced. Two load of these Ashes will manure an Acre of Land better than six load of those that are exposed to the Rain, and that are not ordered so, which is the common allowance for an Acre, though some Lands do require more, and some less. That the Ashes of any sort of Vegetables are very advantageous to Land, is what is experienced in most places of *England*, by the Improvement that is made by burning of Fern, Stubble, Straw, Heath, Furze, Sedge, Bean-stalks, &c. But in burning of Stubble great care should be taken to plow the Land up round the Field, that the Fire may not take the Hedges, which 'tis very apt to do if fear Wood be in them, or the Leaf be on the Trees. Of all sorts of Ashes I esteem

Sea-

Sea-coal-ashes the best for cold Lands, and the most lasting: If you sow your Ashes upon Grass-ground, do it in *April*, but upon Corn just after you have sowed your Seed.

Soap-ashes Sir *Hugh Plat* commends very much after the Soap-boilers have done with them, both for Corn and Grass: they are good for cold or sowe Lands. I am told of one by *Ware* that had a piece of Land that was run over with Broom and Furz, which he manured with Soap-ashes, and sowed it six Years together with Wheat, and had incredible Crops: But I could not learn what the Nature of the Land was, nor the Quantity that he laid on: The common allowance is eight load on an Acre. Some say it kills all sorts of Weeds and Trumpery whatsoever, especially Furz, Broom, and Fern, and will last four or five Crops.

The Ashes, after the Pot-Ash-Men have done with them, are good for most sorts of Land, only as they have been wet, and so the Lee hath drawn out most of the Salt, it will be necessary to lay them much thicker than other Ashes.

Soot also is very good both for Corn and Grass, especially what grows on cold Clays or Lands much run over with Moss; but Sea-coal Soot is the best by much: They commonly allow forty Bushels to an Acre, but some Lands will require more: It produces a mighty fine sweet Grass, and destroys Weeds and Trumpery. Wool-nippings and tarred hempen Ropes cut small and untwisted, are beneficial for Lands.

Rags are also a very great Improvement of chalky binding Lands. Many loads of them are fetched from *London* to *Dunstable*, which is
thirty

thirty Miles, only to lay on their Lands; they cost about Four-pence *per* Bushel at *London*. They chop them very small, and sow them just after the sowing of the Corn, allowing four Sacks to an Acre, each Sack containing six Bushels.

All sorts of Hair of Beasts, being thinly spread or sown, and suffered to putrifie, make a very great Increase on Corn-lands, especially on some sort of Lands, and is light Carriage, thirty Bushels being enough for an Acre. 'Tis best for Barley, and is commonly sold for 8 s. a Bushel; it will last two or three Crops. And all Shavings of Horns, Hoofs of Cattle, Blood, Garbidge, &c. is good Manure for Land.

Malt-dust is an enricher of barren Land, and a great Improver of Barley, which they sow by hand as they do the Seed, and after the sowing of it, allowing forty Bushels to an Acre, but it lasts but one Crop.

Some commend Dyers-dung as a Manure very good for all sorts of Land, two load being sufficient for an Acre.

All sorts of Fern, Straw, Stubble, Rushes, Leaves of Trees, or any manner of Vegetable whatsoever, cast into the Dung-yard, before they are near feeding (else they are apt to breed Weeds in the Dung) are of great advantage to increase the bulk of the Dung.

Barks of Trees have a very rich Salt in them, especially that of Oak, and so hath rotten Saw-dust, or any other rotten Wood, which mixed with Earth makes Land light, enriches it very much, and even alters and changes the very Nature of it, turning of it into a rich black Mould.

In the Coal-mines they usually dig a kind of blue or black Clay, that lies near the Coal, commonly called *Urry*, which is as it were an unripe Coal, and is very proper for hot Lands, especially for Pasture-grounds.

In *Cheshire* they improve their Lands by letting out the Water of the Salt-springs on them, which they do always after Rain; and there is no doubt but that a moderate quantity of Salt sown upon Lands, especially those that are troubled with Worms, would be a very great Improvement of them: There being no Lands richer, and that fat Cattle sooner than those Lands that are but some sometimes overflowed with the Salt-water; as only at some extraordinary Spring-tides, as may be seen in some salt Marshes near *Erith*, and in some Parts of the Hundreds of *Essex*, especially where they have any fresh Water to go to in some near adjoining Lands: And therefore I cannot but think that Lands near the Sea might be much improved by watering of them with salt Water; however in time of Peace Bay-salt would be but a small Charge, considering how small a quantity would manure an Acre: For some say that if you sow but two Bushels of Salt upon an Acre after the Corn is sowed, it will make a great Improvement of the Land, and keep down the Weeds.

In *Cumberland* a small parcel of Land of two Acres and a half is Let for Eleven Pound *per Annum*. What improves it to that Value is the emptying of the Town Tann-pits on it.

Any soft Stone, as Fire-stone, Lime-stone, &c. if broke small, and laid on cold Lands, must be of advantage to them, as is practised at *Hornetton* in *Oxfordshire*, where they dung their

their Lands with the Chippings of a sort of soft Stone that they have there. In fine, whatsoever is apt to rot and consume in any competent time, and that is either salt, unctuous or fatty, is good for the Improvement of Land.

All these Dungs and Soils before-mentioned are improved by the mixing of them together, and by the giving of them a good Fermentation: The common way of doing of which, is by laying of the Dung on heaps till it rots; but the way that would be most profitable to the Husbandman, is to make near his House or Barns a large Pit in length and breadth according to the quantity of the Soil he hath, and to pave it with Stone or Chalk, that it may detain the Moisture of the Dung; because the moister the Dung lies, the sooner it will ferment and rot; but if you can have a covering over it, so as to keep all the Rain-water out of it, or if you can moisten it with the Urine of your Stables, Sink of your House, &c. it will much improve it: For the Rain-water that runs from it carries away the Salt of the Dung with it, which is the chief Cause of its Fertility. But if you cannot have such a Conveniency, lay it as thick on heaps as you can, and in the moistest lowest Places that you have, covering the top of it with Turf or other Earth, to prevent the Sun and Wind from exhaling and drying up the Vertue of it: For the well preparing of your Dung, and the Increase of its Quantity, is a piece of Husbandry that great Care ought to be taken of; for the better and greater the quantity of your Dung is, the better will be your Crop; and the Increase of your Crop will make an Increase of your Dung; and so on the contrary, a Decay in
your

th

your D
and th
the Va
two Po

Of ser
the V

R
bout t
mers-f
cordin
the D
monly
but i
subje
more.

A
Rye-I
thoug
for o
bout

It
and h
'Tis n
is we
or Ga
or ter

your Dung makes a Decay in your Crop, &c. and therefore the Whole of your Profit, and the Value of your Farm depends upon these two Points.

B O O K V.

Of several sorts of Corn, Grain, &c. and the Way and Manner of Ordering of them.

Chap. I. *Of Rye.*

RYE doth well upon any dry sort of Land whatsoever, though the barrenest Sand or Gravel. They sow it about the beginning of *September*, after a Summers-fallow, in the driest Time they can, according to the old Saying of Sowing, *Rye in the Dust, and Wheat in the Dirt*: They commonly allow two Bushels of Seed to an Acre; but if 'tis new-broke-up Ground, or Land subject to Worms, they allow about a Peck more.

A little sprinkling of Dung or Mud upon Rye-Land will mightily advance a Crop, though it is laid but half the thickness it is for other Corn. Its Produce is commonly about twenty Bushels upon an Acre.

It is ripe when the Straw is turned yellow, and hangs the Ear, and that the Grain is hard: 'Tis not very apt to shed; and therefore if it is weedy you must let it lie upon the Ground or Gavel, as they call it, after it is cut, eight or ten Days before you bind it, if the Weeds
are

are not dry sooner, or else they will give in the Barn, and cause it not to thrash well, and make it musty. But as it is a Grain that will grow in the Ear the soonest of any, if wet, so you must take care, if Rain comes, to turn it once in two or three Days at most, and to lay the Ears upon the Stubble as high above the Ground as you can, and it will prevent it: But if it is without Weeds, you may house it as you cut it. If Rye or Wheat be lodged, cut it though it be not thorough ripe; for if the Straw is broke, it will yield no more Nourishment to the Grain. To have Food for Cattle in *April*, which is the scarcest time of all the Year, especially for Sheep and Lambs, some split the Ridges of their Wheat-Stubble, and sow them with Rye, allowing about a Bushel to an Acre, which they harrow in, and feed about *April*, or when they want it; and in *May* plow it up for a Fallow.

Chap. II. *Of Wheat.*

THere are several sorts of Wheat, as whole Straw-wheat, red Straw-wheat, River-wheat, white and red Pollard-wheat, Turkey-wheat, Gray-wheat, Lammas-wheat, &c. some of which thrive better, and are more agreeable to some sorts of Land than others, though generally all Wheat doth best upon stiff Clays, especially if well drained that it lie dry: But as some sorts of Wheat thrive better on some sorts of Lands than others; it would do well if more particular Observations about each sort were made than is. The white Egg-shell-wheat is reckoned best for light Lands, and to sow with

the
with R
of any,
much s
Earths
Pole-riv
Hertfor
fordshire
call lon
for ran
makes
dewed,
Birds,
Their v
and a
Wheat
and fel
the red
cold L
Wheat
ing of
In A
have a
with a
comme
largen
Straw,
or spo
bearde
that h
Birds
Wh
Fallow
upon a
Oats,
Weeds
upon
the B

with Rye for Messin; because 'tis earliest ripe of any, and should be forwardest sown. 'Tis much sown in *Essex* upon their hazely Brick-Earths or Loams, as the Red-wheat and the Pole-rivet or Bearded-wheat is there, and in *Hertfordshire* upon stiff yellow Clays. In *Oxfordshire* they have a sort of Wheat that they call long Cone-wheat, which they reckon best for rank Clays, and its Straw not being hollow makes it not subject to lodge or to be mill-dewed, and is not so liable to be eaten by the Birds, only the Flour of it is somewhat coarse. Their white, red-ear'd Wheat hath a white Ear and a red Grain, and is a very good sort of Wheat for Clays; it bears a very good Crop, and seldom smuts. In *Staffordshire* they reckon the red Lammas or Bearded Wheat the best for cold Lands or stiff Clays. In *Berkshire* is a Wheat called Pendulum Wheat, from its hanging of its Ear much like the Cone-wheat.

In *Northamptonshire*, Mr. Moore says, they have a sort of Wheat that has a white Straw, with a reddish Ear and Grain, which they commend very much for the plumpness and largeness of the Grain, and the strength of the Straw, which prevents its being subject to lodge, or spoiled by Birds, they have also a red-ear'd bearded Wheat, and a sort of Pollard-wheat, that has so close and thick a husk, that the Birds never injure it.

Wheat is commonly sown after a Summers Fallow, though in *Berkshire* they often sow it upon a Lay, harrowing of it in as they do Oats, and say that it prevents its being full of Weeds; sometimes in *Hertfordshire* they sow it upon an Etch-Crop after Barley, plowing of the Barley-stubble in as soon as the Corn is off

off the Land. But this is seldom done, and only on Land that is very rich. 'Tis best sowing of it about the beginning of *September* if you have any Rain; if not, 'tis best staying till you have: For it will not come up till Wet comes, let it be never so long first, except the Land is very moist just before sowing. I have know Wheat mustied and spoiled so as never to come up at all, that hath lain long in the Ground before Rain came: And if your Land be any thing dry, it will do well enough if sown in *November*. All the hazard of late sowing is a wet Winter and wet Land. They commonly sow two Bushels of Wheat upon an Acre: But if new-broke-up Ground, two Bushels and a Peck. If the Soil be deep, sow it under Furrow: But if 'tis fleet, with a broad Cast, which some do with a single Cast, and some with a double Bout, that is, to sow it twice in a place, harrowing once between, after which they harrow it so many times in a place as is necessary to cover the Seed well. I have known Wheat very good that was sown in *July*, but then they feed it with Sheep till *Allballowtide*.

If your Wheat or Rye be rank, it will do well to feed it with Sheep in *January* or *February*, only you must observe not to feed Rye after the first, nor Wheat after the Middle of *March*.

If *May* prove dry, the Corn will get above the Weeds; if not, weed it about the latter End of *May* at farthest: The Thistles cut with a Hook, but the Docks, Tyne, Tares, May-weed, &c. pull up by hand.

Wheat

Wh
low,
ness a
you bi
mon P
an Acr
If W
and be
Oxford
bind u
of Wee
Sheave
Sheave
ones, h
they le
Month
for no
ject to
sixty P
to forty
to sixty

A R

Y O
th
ring it
wards a
a Skin
Wheat.
Wheat
in this
Put
sufficien
Salt int
make a
VOL

Wheat is ripe when the Straw is turned yellow, that it hangs its Ear, and that no Greenness appears in the middle of it, and if when you bite the Grain, you find it hard. Its common Produce is twenty or thirty Bushels upon an Acre.

If Wheat is weedy it must lie upon the Gavel, and be ordered as they order the Rye. But in *Oxfordshire* and several other Countries, they bind up their Wheat in Sheaves, tho' 'tis full of Weeds, and set three Sheaves against three Sheaves, and cover the top by opening of two Sheaves, with which they cover the six underones, hanging of the Ears downward, and so they let their Wheat stand three Weeks or a Month in the Field, before they carry it in, for no wet can hurt it; nor is Corn so set subject to grow. Wheat weighs from fifty six to sixty Pound the Bushel, Barley from forty four to forty seven Pound, and Peas from sixty three to sixty six Pound.

A RECEIPT to prevent Wheat from being Smutty.

YOU must first wash your Wheat in a Tub through three or four several Waters, stirring it round each time with a large stick backwards and forwards with great force, and with a Skimmer each time, take off all the light Wheat. When this is done, you must put that Wheat into a Liquor prepar'd for that purpose in this manner:

Put into a large Tub which hath a Tap a sufficient quantity of Water, then put as much Salt into it as, when 'tis well stirr'd about, will make an Egg swim, then add as much more

Salt as was before, and stir it very well; and to this put two or three Pounds of Alum beaten very fine, and stir it about.

This you are to use as you do your ordinary Brines, only you must let your Wheat steep thirty or forty Hours, for less signifies nothing; though the common Opinion is, that steeping so long kills the Seed in Wheat; but Experience teaches the contrary.

You must take your Wheat out the Night before you sow it, and sift some slack'd Lime on it, which serves only to make it dry enough to sow. 'Tis necessary to add some more Water to it in a Week or ten Days time as it wastes, and Salt proportionable to the Water, and about a Pound of Alum.

Note, Many Farmers steep their Wheat in a Brine, yet have plenty of Smutty Wheat, because they don't make their Brine strong enough, and take their Wheat out too soon.

Note also, Many Farmers have suffered greatly by smutty Wheat, especially in a dear Year, when such Wheat will not sell for above five or six Shillings a Bushel; whereas that which is free from Smut will sell for ten, eleven or twelve Shillings: And such smutty Wheat being eaten chiefly by the poor People, and being unwholesome, occasions Sickness. Experimented, Printed and Recommended by a Gentleman in *Hertfordshire*.

Chap. III. *Of Barley.*

THE Barley sown in most Places is commonly of one sort; but in some Places they sow *Sprat* or *Fullum* Barley, which is the best

best for rank Land, because it doth not run so much to Straw, as the common sort, and yields much better. It will also grow on cold wet stiff Land.

In *Oxfordshire* is a sort that they call Rath-ripe Barley, which hath some Years been sown, and returned into the Barn in two Months time; some call it *Patney* Barley, because they commonly have it from *Patney* in *Wiltshire*. It may be sown the latter end of *May*, and yet be ripe early enough.

In *Lincolnshire* they sow a sort of Barley that they call *Scotch* Barley. It hath a square Ear: 'Tis but a lank Grain, but 'tis a hardier sort than the other sorts of Barley are, and will grow upon a meaner Soil, and is earlier ripe.

In *Staffordshire* is *Tritico-Speltum*, or a sort of naked Barley or Wheat-Barley, that is shaped like Barley, but the Grain is like Wheat; 'tis much sown at *Rowley*, *Hamstal* and *Redmore*, where they call it *French* Barley: It makes good Bread and good Malt, and yields a good Increase; and therefore would do well to be tried in other places.

Barley is sown either after a Fallow, or on an Etch or Second Crop. If after a Fallow, the Land must be three times plowed in Summer, or for Wheat, only the third time it must be laid up in small Ridges to lie all Winter: In *March* they split the Ridges and harrow them well over, making of the Land as fine as they can, and then they plow it up to sow.

Some at the time of Twy-fallowing in *June Turnips*, make the Land very fine and sow it with Turnips, which they feed with Sheep in Winter, and then plow it up in *March*, ordering of it

as before; or you may plow it up but once just before you sow your Barley.

If you sow your Barley upon an Etch after Wheat, as soon as the time of sowing of Wheat is over, which is commonly about the beginning of *October*, plow up your Wheat-stubble in as dry a time as you can, and lay three Ridges to one, if you have Dung to lay on it, if not, plow it in small Ridges as before is directed, because the Land will lie the dryer, and the Frost will mellow it the better: Then plow it up again in *March*, and order it as before. If 'tis sown after Oats, you may only plow it once in *March*; but if you plow it in *October* too 'tis the better: Or if you have an early Harvest and dry Weather, and that your time will allow of it, it will be a greater Improvement of your Land, if you plow it up before you sow your Wheat just as Harvest is in; this will make it half as good as a Summers-fallow. But all Years will not allow the doing of it this way.

One in *Essex* that lives near a large Market-Town where he hath good Quantities of Dung, sows his Land with Barley and Clover; he reaps his Corn at Harvest, and feeds his Clover all Winter, in Spring he mows or feeds it till the middle of *July*, and then fallowing of it, in Spring he sows it again with Barley and Clover, which he repeats every Year, and hath very great Crops; his Land is a light rich Mould, somewhat inclining to a gravelly Bottom.

Some sow Barley in small Ridges like Wheat, and some on broad Lands, which the rounder they are laid the better: But all sorts of Ridges they rowl with a Roller at the coming of the first

first fl
is sow
before
Corn,

The
April
'tis be
take t
Weath
if you
Hours
Pigeon
come
quicke
very
est La
bout t
if war
you to
Lands
the Cl

'Tis
or Sov
in onc
as is r
Earth
seven
Seed i
say t
do.

It d
the b
Clays
Ashes
dung,
Plat c
Impro

first shower of Rain that comes after the Barley is sown, for to break what Clods were unbroken before, to settle the Earth to the Roots of the Corn, and to make it even to mow.

The time of sowing of Barley is in *March*, *April* or *May*. If the Land is subject to Weeds, 'tis best sowing late; but 'tis commonly best to take the first dry Season that you have, dry Weather being best for most Summer-Corn. But if you sow late, soak your Barley twenty four Hours in Water, in which Sheeps-dung or Pigeons-dung hath been infused, and it will come up presently. This, Mr. *Moor* says, quickens the growth of the Seed, and adds very much to its increase even upon the poorest Land. This way you may sow Barley about the middle of *May*, and it will do well, if want of good Weather or Business, oblige you to stay so long. 'Tis best to sow light Lands first, the best Lands to sow late, being the Clays.

'Tis sown with a broad Cast at two Bouts or Sowings, the first sowing being harrowed in once, and the second sowing as many times as is needful to cover it well, and to make the Earth fine, which commonly requires six or seven Harrowings. The common allowance of Seed is four Bushels to an Acre, though they say that three Bushels of Sprat Barley will do.

It delights in a light dry Ground, such as is the black rich Mould, and in most sorts of Clays that lie dry, if made rich with Dung, Ashes, Chalk or Lime; on some Lands Pigeons-dung, Malt-duft or Soot do well first. Sir *Hugh Plat* commends Soap-ashes as an extraordinary Improver of Barley, even upon barren Lands.

Barley is ripe, when the red Roan, as they call it, is off (that is a reddish kind of Colour that is on the Ear) when it hangs its Ear, and that the Straw hath lost its Verdure. If it is full of Weeds it must lie on the Swath till the Weeds are dead: 'Tis not apt to shed but in wet Weather it will be inclined to sprout or must; and therefore every fair Day after Rain it should be shook up and turned; and as soon as it is any thing dry, be made up into Cocks, but be careful not to house it green, lest it snow-burn, which will make it Malt worse than if it should spire in the Field. Its common Produce is two or three Quarters upon an Acre.

Chap. IV. *Of Black Oats.*

BLack Oats are commonly sown upon an Etch-Crop, or on a Lay; which they plow up in *January*, when the Earth is moist, taking care to turn the Turf well, and to lay it even and flat. Oats in the Northern Parts of *England* do well to be sowed earlier than in the Southern Parts.

Oats are sown with a broad Cast at twice as they do Barley, harrowing of it well in: only you must observe to harrow the same way the Furrows lie of a Lay, or but very little cros, for fear of raising the Turf; but upon an Etch, as soon as the Land is plowed on edge, they sow it, and then harrow it once, and sow it again a second time the full quantity, and then harrow it five or six times over, observing to harrow once or twice cros; which breaks the Clods and covers the Seed better than harrowing all one way. They commonly sow them

on

on a b
but on
The
the la
March
any t
Seed
They
more
Oat
and th
open
WH
and R
thrash
but if
in as
they v
test o
them,
But v
lie, a

W
only
them
except
good
Nov
be a
have
Oats
sow t

on a broad Ridge, which they give the Land but one plowing for.

The usual time of sowing of Black Oats is the latter end of *February*, or the beginning of *March*, they being a hardy Grain that will bear any thing of Wet or Cold: Four Bushels of Seed being the usual allowance for an Acre. They will grow on any Land, but delight more in a moist cold Land than in a dry.

Oats are ripe when the Straw turns yellow and the Kernel hard, when the Chaff begins to open and to shew the Seed.

When they are cut, let them lie for the Dew and Rain to plump them, and to make them thrash well; and if weedy, to kill the Weeds; but if Rain wet them much, you must get them in as soon as they are any thing dry again, or they will shed; for Oats may be in the wettest of any Corn without much prejudice to them, especially if the Weeds are but dead: But White Oats are apt to shed most as they lie, and black as they stand.

Chap. V. *Of White Oats.*

WHite Oats are commonly sown upon an Etch after Wheat, Rye or Barley; they only give the Land one plowing, and sow them and harrow them as they do Black Oats, except the Land is subject to Weeds; then 'tis good to plow the Wheat or Rye-stubble up in *November*, which will make it rot the better, and be a kind of Winter-fallowing: Only if you have a very dry burning Ground which Black Oats will not delight in, in that case they often sow them upon a Lay.

The usual time of sowing of White Oats is in *April*; the drier the time is that you sow them in, the better. They love a dry Land, and will do well on Gravel and Sand, and are the best Corn to sow on Grounds subject to Quitch-grass or other Weeds, because they may be plowed later. They come up sooner, and top the Weeds better than black.

As to the mowing and ordering of White Oats at Harvest, 'tis the same with that of the black; the common Produce of both black and white Oats is about twenty Bushels upon an Acre.

In *Staffordshire*, and almost all the Northern Parts, is a sort of red or naked Oats that is extraordinary good for Oat-meal, because the Kernel thrashes out of the Hull without carrying of it to the Mill, or drying of it: They order these Oats as they do Barley.

Chap. VI. *Of Buck-Wheat.*

Buck-Wheat or Brank, is a Grain very useful and advantageous in dry barren Lands. 'Tis commonly sown about the beginning of *May*. One Bushel will sow an Acre. After 'tis mown it must lie several Days till the Stalk (which is somewhat hard) be withered before it is housed. 'Tis in no danger of the Seeds falling, nor doth it suffer much by Wet; but 'tis ripe pretty late. It yields a good increase upon Land any thing good, often fifty or sixty Bushels upon an Acre, and is excellent Food for Hogs, Poultry, &c. The Flour of it is very white, and makes a very good sort of Pancake mixed with a little Wheat Flour.

The

The Straw is good Fodder for Cattle, and the Grain given to Horses amongst their Oats will make them thrive, but then it should be just broke in a Mill, else 'tis apt to come thro' Cattle whole.

Buck-Wheat makes a very good Lay for Wheat or Rye, especially if not mow'd, but plow'd in; but the best way is when 'tis in Grass, just before it blossoms, to feed it with Cattle, especially milch Cows, which it will cause to give a great deal of Milk, and make both the Butter and the Cheese very good, and yield Food for your Cattle in the driest time of Summer, when all other Grass is burnt up, and prove a very great Improvement of your Land. But for this purpose they commonly sow it thicker than for other uses, some sowing three or four Bushels on an Acre.

Chap. VII. *Of Pease.*

PEASE are of several sorts, as white, green, grey, &c. most of which require different sorts of Land and Management; and therefore if more particular Observations could be made of them, it would be of advantage to Husbandry, all codded Grains being a Destroyer of Weeds, an Improver of Land, and a Preparer of it for other Crops. But Pease and Beans are what belong to Garden-Tillage, as well as that of the Field; and as I design not to meddle with any thing of Gardening at present, so I shall confine my self only to what relates to the Management of them in the Field,

The

The common sort of white Pea doth best in a light Land that is somewhat rich : If the Land is any thing binding, they do best sown with a broad Cast, and only harrow'd in : The best time for sowing of them, is about the middle or latter end of *April* ; they commonly allow three Bushels to an Acre.

Pease are commonly reaped with a Hook at the end of a long Stick. They let them lie in small Heaps as they are reaped, 'till they find the Hawm and the Cod dry. They ought to be turned and raised from the Earth as much as you can, that they may lie hollow for the Wind to dry them, especially when any Rain comes to wet and beat them down.

In *Staffordshire* they sow Garden-Rouncivals in the Fields, and find them to kernel well, and to yield a good Increase, though they run upon the Ground unsupported with Sticks.

Gray-pease are commonly sown under Furrow, and delight most in a cold moist Clay : The common Allowance for Seed is two Bushels to an Acre, and the usual time of sowing them is in *February* : In some places they sow them sooner, they being a hardy Grain. They are reaped, and ordered much as the white Pea.

In *Oxfordshire* they reckon the *Henley* gray and the red-thank Pease are the best for new-broke-up Ground, the *Vale-gray* for strong Land, the *Hampshire* Kids for new-chalk'd Lands, the small *Rath-ripe* Pease for poor gravelly Ground, and the *Catswold* Pea for sowe Land.

In *Suffolk* they often plow up their Lays the beginning of *March*, and turning of the Turf well, they have a cross stick set with Iron-pegs,

pegs,
which
to w
single
Peas
being
full
and a
Field
up ag
Whea
Oats,
and a
Bl
sandy
Al

BE
paga
in a
in li
sown
will
with
great
them
Rick
let t
duce
Acre
T
forts
the S

pegs, which they strike down with their Feet, which Pegs make holes at an even distance, into which they have Boys and Girls to put a single Pea till they have set the Field all over. Peas thus set upon fresh Land, and the Turf being new turned, are reckoned not to be so full of Weeds as if sown upon other Land; and as soon as the Peas are cut, they plow the Field cross, and harrowing of it well, plow it up again, and sow it about *Michaelmas* with Wheat, and the next Year with Barley or Oats, according to the Nature of the Land, and as 'tis in heart.

Blue Pease are the best sort of Pea for light sandy Land, being early sown.

All sort of Peas love limed or marled Land.

Chap. VIII. *Of Beans.*

BEANS are of several sorts, but 'tis only the small Horse-bean that is commonly propagated by the Plough. They delight chiefly in a stiff strong moist Clay, and thrive not in light or dry Grounds. They are commonly sown in *February* or sooner. Three Bushels will sow an Acre. They commonly reap them with a Hook like Pease, and let them lie out a great while to dry. In the North they bind them up in small Bundles, and make small Ricks of them in the Field, where they let them stand a long time. The common Produce of them is about twenty Bushels on an Acre.

The Chich, Fetch or Vetch are of several *Vetches*. sorts, but the most known are the Winter and the Summer Vetch; the one sowed before Winter,

ter, which abides the Extremity of it, and the other in Spring. They are a good, strong and nourishing Food for Cattle, either given in Straw or without, and are propagated after the manner of Pease.

Vetches sowed early and plowed in just at their blooming time, will make the Land light and hollow, and enrich it, especially stiff Clays.

If you have any Vetches, lay them by themselves in some convenient place separate from your other Corn, or else they will be apt to foul it.

Lentils.

The least of all Pulses is the Lentil, in some places called Tills. They require but an ordinary Ground; and though but very few of them are sown upon an Acre, yet they produce an incredible quantity, though they seem but of small bulk, and lie in a little Room in the Cart. They are a very good sweet Fodder, and to be preferred before any for Calves, or any other young Cattle, and are the cheapest Food for Pigeons.

Tares:

Tares are of as great advantage to Land as other Pulses are, but are rather to be preferred to feed Cattle with than any other thing, only the Seed is good for Pigeons. They are commonly sown in *February*, and require a dry Ground. They need but one plowing, and want no other Manure, but the plowing in of the last Stubble, because they enrich the Land themselves. You must be careful not to sow more than you can cover the same Day, because the Dew is apt to spoil them.

Some sow Horse-beans and Tares together, which is a very good way of ordering them. They are easily parted with a Riddle.

There

There are several other Pulses or Seeds mentioned in many Authors, that are not yet brought into common Use, which, if more particular Observations were made of them, might in many places be more useful than they are. But of them I shall treat farther, when I have procured a more particular Account.

Chap. IX. Of Preserving of Corn.

THE Preserving of Corn when it is cheap and good, is not only a very great advantage to the Husbandman, but likewise to the Poor; for in scarce and dear Times the Husbandman hath little to sell to advance his Stock, and the Buyers are usually furnished with musty bad Corn from Foreign Parts (who often buy our Corn when cheap, and sell it to us again when dear) or from such as were ignorant of the ways of preserving it. Therefore in cheap times it will be necessary to make use of some of these following ways for the storing up of Corn against a Scarcity, which he may be sure of buying in cheap in dry Years, and be certain of selling dear in wet ones.

The common ways of keeping Corn are in the Straw unthrashed, or in the Granaries when 'tis thrashed. As for the keeping of it in the Straw, the common way is to make it up into Stacks, by which way they often have very great loss by the dampness of the Ground, which commonly rots and spoils it, sometimes near a Yard thick; and by Rats and Mice, and other Vermin that breed in the Stack, which eat and devour

ter, which abides the Extremity of it, and the other in Spring. They are a good, strong and nourishing Food for Cattle, either given in Straw or without, and are propagated after the manner of Pease.

Vetches sowed early and plowed in just at their blooming time, will make the Land light and hollow, and enrich it, especially stiff Clays.

If you have any Vetches, lay them by themselves in some convenient place separate from your other Corn, or else they will be apt to foul it.

Lentils.

The least of all Pulses is the Lentil, in some places called Tills. They require but an ordinary Ground; and though but very few of them are sown upon an Acre, yet they produce an incredible quantity, though they seem but of small bulk, and lie in a little Room in the Cart. They are a very good sweet Fodder, and to be preferred before any for Calves, or any other young Cattle, and are the cheapest Food for Pigeons.

Tares:

Tares are of as great advantage to Land as other Pulses are, but are rather to be preferred to feed Cattle with than any other thing, only the Seed is good for Pigeons. They are commonly sown in *February*, and require a dry Ground. They need but one plowing, and want no other Manure, but the plowing in of the last Stubble, because they enrich the Land themselves. You must be careful not to sow more than you can cover the same Day, because the Dew is apt to spoil them.

Some sow Horse-beans and Tares together, which is a very good way of ordering them. They are easily parted with a Riddle.

There

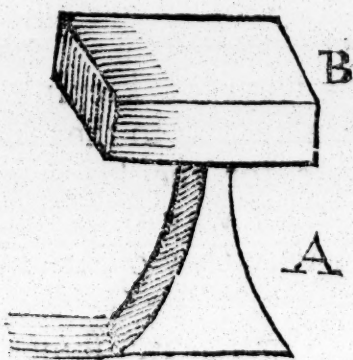
There are several other Pulses or Seeds mentioned in many Authors, that are not yet brought into common Use, which, if more particular Observations were made of them, might in many places be more useful than they are. But of them I shall treat farther, when I have procured a more particular Account.

Chap. IX. *Of Preserving of Corn.*

THE Preserving of Corn when it is cheap and good, is not only a very great advantage to the Husbandman, but likewise to the Poor; for in scarce and dear Times the Husbandman hath little to sell to advance his Stock, and the Buyers are usually furnished with musty bad Corn from Foreign Parts (who often buy our Corn when cheap, and sell it to us again when dear) or from such as were ignorant of the ways of preserving it. Therefore in cheap times it will be necessary to make use of some of these following ways for the storing up of Corn against a Scarcity, which he may be sure of buying in cheap in dry Years, and be certain of selling dear in wet ones.

The common ways of keeping Corn are in the Straw unthrashed, or in the Granaries when 'tis thrashed. As for the keeping of it in the Straw, the common way is to make it up into Stacks, by which way they often have very great loss by the dampness of the Ground, which commonly rots and spoils it, sometimes near a Yard thick; and by Rats and Mice, and other Vermin that breed in the Stack, which eat and devour

devour a great part thereof. To prevent both which Inconveniencies, where Timber is plentiful, they set four, or six, or more Posts into the Ground, according to the bigness that they design the Stack, Granary or Barn that the Corn is to be laid in : On these Posts they lay What is the Ground-plats of other Building, upon which they make a Floor, or lay pieces cros to support the Stack : And if they make a Barn or Granary of it, they erect Sides and a Roof upon it ; but if only a Stack, they cover it with Thatch, and the Posts that support it some do round with Tin near the top, for about a Foot or so in breadth, to prevent the Mice and Rats getting up. But as Tin is apt to rust, and so to lose its smoothness, it will not keep them down long ; and therefore a better way to prevent their getting up, is to do them with *Dutch Tile*, such as they set Chimneys with, which will always keep smooth. But in *Hampshire* and other Countries where they have plenty of Stone, they make their Supporters of two Stones after this Form, which is the best way.



The lower Stone at *A* is about three Foot high, two Foot wide at the bottom, and one at the top, over this they lay another Stone, as at *B*, of about a Yard square: Some make it of a round Form, which is the best. This prevents not only the Mice and Rats from climbing up, but also the Dampness of the Ground: And this way you may keep Corn as long as you will, without much Inconvenience or Loss, except what it looseth in the first Years shrinking, and loss of Weight, which is very inconsiderable. Only you must observe, that what Corn you stack must be bound up in Sheaves, that so the Ears of the Corn may be turned inward, and the Straw-ends out, which will save the Corn from Pigeons, Crows, and other Fowls, and likewise from the Rain that beats on the sides. If your Stack be of Wheat, you may lay Oats or other coarse Grain on the top of it, under the Thatch, the greatest danger of Wet being from the top, if any of the Thatch should blow off. And if you suspect any Rats or Mice got into the Stack, grease a Stick and thrust it into it; and if there be any, they will gnaw the Stick. The chief Inconvenience that attends this way of keeping of Corn, is its Bulkiness, and the Farmer's wanting of his Straw to make Dung with, and the Chaff to give his Cattle, &c. Which several Occasions may compel him to thrash out his Corn: And therefore I shall consider the ways of keeping it, after 'tis thrash'd and dress'd, in Granaries, which are made divers ways, according to the Nature of the Country, and the Materials it affords, and the Custom of the People.

Some

Some Granaries are made with Clay mixed with Hair, chopp'd Straw, Mulch, and such like : But these are the worst, because they harbour Vermin, and soonest corrupt Corn : For although they are warm, which is a great Preservation of Corn, yet they yield Dust, and from that Dust are bred Fleas, Mites, Weevels, &c. which spoil Corn and make it easily rot.

Others are made of Stone and Lime ; but they are subject against wet Weather, to give and be moist, which is very bad for Corn, and will must it ; and so will those made of Brick ; and therefore some propose as the best, either those Buildings that are made with Stone only, and Plaister laid on the inside an inch and a half thick, that so no Stone may come near the Corn ; or else to be made of Brick mix'd with Timber, to which Boards may be fastned to line the Walls with, and the Floors to be of Plaister, which is cool in Summer, and hot in Winter, and is a great help in the keeping of Corn ; and that the Windows of your Granaries be to the East or North-East, because it keepeth the Corn always dry, fresh and cool : And if likewise you have Holes to let the Air blow through, it will do well.

The Granary in the City of *Shenibank* in the Vale of *Parinburg* upon the River *Elbe*, which is a Store-house for the Wheat of which the Mum is made at *Brunswick*, is made after this manner. The Granary is three hundred Foot long, eighteen Foot wide within, seven Stories high, each Story seven Foot, all built of Brick, with large Windows round to open and shut close, which as the Wind blows are opened, as the Men turn the Corn, so that the Dust may fly out : And when the Weather is fair, they open

open
end,
in, in
of gr
There
three
Lofts
Corn
anoth
top, a
throug
Room
in the
down
by the
ceives
and S
occasi
when
by th
Barges
&c. T
and a
Storie
There
Quart
Quart
in eac
eigh
three
In
to the
Foot
once
Mont
for tw
twice
VO

open the Windows to let in the Air. At each end, and in the middle, are Stoves to keep fire in, in moist Weather, and at the going away of great Frosts and Snows, to prevent Moisture. There are also in each side of the Granaries three long Troughs or Spouts in the upper Lofts, and in fair Weather the Men throw the Corn out of the upper Loft, and so it falls into another Spout made about ten Foot wide at the top, and eight or ten Inches at the bottom, through which the Corn falls into the lower Rooms, and then is wound up by a Crane fixed in the upper Loft; and so the Corn falling down from one Story to another, is cleansed by the Wind from all Dust and Chaff, and receives the Benefit of the Air, &c. These Troughs and Spouts are to be put on and taken off as occasion requires, to any of the Windows, that when any Vessels come to lade Corn, they may by these Spouts convey the Corn into the Barges, without carrying it on Mens Backs, &c. The Wall of the first Stories is two Bricks and an half thick, two Bricks the three next Stories, and a Brick and an half to the top. There may be kept in it fourteen thousand Quarters of Corn, which is two thousand Quarters in each Loft, or one thousand Bushels in each Bay, there being sixteen Bays, each eighteen Foot long, about seventeen wide, or three hundred square Feet in each Bay, &c.

In *Kent*, when they first bring their Corn in to their Granaries, they lay it about half a Foot thick, and turn it twice a Week, and once in that time screen it for the first two Months. After that they lay it a Foot thick for two Months more, turning of it once or twice a Week, and skreening of it proportiona-

VOL.

L

bly

bly, according as the Weather is moist or dry: after five or six Months more they lay it two foot thick, and turn it once a Fortnight, skreening of it once a Month, as occasion requires. After a Year they lay it two Foot and a half, or three Foot thick, and turn it once in three Weeks or a Month, and skreen it proportionably. When it has lain two Years or more, they turn it once in two Months, and skreen it once a Quarter, and so on, as they find it in brightness, hardness and dryness; for the oftner 'tis turned, the better the Grain proves. They leave an empty space about a Yard wide on all sides of the Room, and another at six Foot distance through the whole *Area* empty of Corn, into which empty spaces they turn the Corn as often as need requires.

I am told that Corn has been kept in the Granaries at *London* thirty two Years, and the longer 'tis kept the more Flour it yields in proportion to the quantity of Corn, and makes the whiter and better Bread, the superfluous Humidity only evaporating. In Foreign Granaries they tell you of Corn kept seventy or eighty Years.

Wheat after a Year's keeping may be kept as long as you will, and will neither lose in weight nor bulk. If Wheat be laid up very dry, and laid thick in Binns, provided the Sun does not come at it to shine upon it, it will keep without any stirring.

If with the Troughs there were Holes in the Floor to let the Corn, like Sand in an Hour-glass, run from one Floor to another, I believe it would save much Labour, and be of much more advantage to the Corn.

In the hot Countries, in dry sandy Ground, they

they m
in; th
and p
their
little
again,
a broa
by wh
Som
into a
and i
Corn
Foreig
The
to bui
good
above
broad
Rats f
and l
Corn
as to
you n
not le
the M
effect
a Ger
Fashi
did g
of R
ing f
high
be li
the le
outfi
being
Earth

they make great Caves or Pits to keep their Corn in; the insides of which they make very smooth and put some of the Chaff in first, and then their thrashed Wheat, filling of it up within a little of the top, upon which they lay Chaff again, 'till 'tis quite full, and close the top with a broad Stone, covering of it up close with Earth; by which way they keep it good many Years.

Some cut off the Ears, and put them up close into a tight Cask, which will keep it very well, and is the only way of carrying any sort of Corn over the Sea, that you desire to sow in a Foreign Country.

The best way of keeping Corn in *England* is to build a Barn of Brick or Stone, plaistered a good thickness within, about four Foot high above the Ground; upon which put a pretty broad Board sloping, to prevent the Mice and Rats from going up: Upon which erect a Barn, and let the Door and Loop-holes to put the Corn in at, be above the shelving Board, so as to go in and out of it with a Ladder, which you must be careful always to take down, and not leave standing up when you come out, lest the Mice get up it into the Barn. This is an effectual way of keeping Vermin out; because a Gentleman in *Hertfordshire* built one of this Fashion, and, as I am told, no Mice or Rats did get into it. By this means there is no loss of Room at the bottom, as there is in a Building set upon Supporters. This sort of Barn, as high as the Brick or Stone-work comes, must be lined with Boards, and the Floor raised at the least a Foot above the Earth that is on the outside of the Barn, to prevent any Damage being done to the Corn by the Moisture of the Earth or Walls. This Floor I would have co-

ver'd with Plaister made of Stone-lime, where 'tis to be had : Where not, let it be boarded throughout. In this Barn you may lay up your Corn in the Straw ; and if you have occasion to thrash out your Corn, to make room to lay more, or for any other reason, you may thrash it out, and at one End of the Barn lay a Layer of Straw of about a Foot thick, and upon that a Layer of Corn and Chaff mixed together, and upon that another Layer of Straw, which continue till your Corn is all laid up ; or you may mingle your old thrash'd Corn with the Straw of the new : Either of these ways you may keep it as long as you will. And I think this the best way ; only I know some will pretend a mighty inconvenience in this sort of Barn, because they cannot run a load of Corn into it if Wet comes. But that Inconvenience may be easily remedied by having a large Barn for Hay near it, with a Porch to run it into. They that have none of these Conveniencies, but are obliged to lay their Corn in a common Room, let them make a hole in the Door to let the Mice and Rats in and out at, and stop all the other holes that the Mice or Rats make in the Room with Wool dipped in Tar, and to the hole in the Door have a small Scuttle to shut down when you go in to keep in what Mice or Rats are there ; and round the Room, about four Foot high from the Ground, place a shelving Board that the Mice and Rats may not run up the Walls ; and with Brooms, &c. you may kill a great many of them. But for Barns, I think those boarded on the sides the best, being the least subject to harbour Mice of any.

I shall conclude this Point with some particular Remarks upon the keeping of several kinds of Corn.

First of Wheat, which is the most principal *Wheat.* Grain, and of greatest Use and Price, being the most tender, and aptest to take hurt of any; and therefore ought not to be laid above a foot thick on the Floor, and observe that the Corn you intend to keep be had in dry; and that no Wheat that is thrashed before *March* is fit to keep long, nor Rye thrashed before *Christmas*. In moist Weather (if it be not kept in the Straw or Chaff) take care to turn your Wheat once in four or five Days.

Rye is much of the same Nature with Wheat, *Rye.* and is to be treated after the same Manner.

For the keeping of Meal there is no better way than first to bolt it, and scarce it from the Bran, which is very apt to corrode and putrifie it, and make it musty. You may put it into clean dry Casks, that are tight and well bound, treading of it in as hard as possible you can, and then head it up close.

Beans are a more gross sort of Grain than *Beans.* Wheat, and more subject to be moist, and to give in the Mow; and therefore those that are to be kept are not to be thrashed till *March*, that they have had a thorough sweat in the Mow, which they are very apt to; because Beans and Pease are not all ripe together, and so the green do often heat the ripe, and the ripe so heated give fire to the green, till both be either rotted or consumed; to which also the bigness of their Leaves, and hardness of their Stalks, which continue moist and sappy a long time, doth much contribute; for which reason they commonly chuse rather to stack them

without doors, than to house them; that so the Sun and Air may dry them. But the best way is to kiln-dry them, or to dry them well in the Sun, and then they will keep many Years, tho' they are laid never so thick, and are not turned, or any care taken of them: For Beans never give again if they are once thorough dry.

Pease.

Pease are esteemed of all Grain whatsoever, the most subject to Rottenness and Imperfection; because they are very apt to breed Worms, Weevils and Mites, by reason of the lusciousness and sweetness of the Grain. They are to be ordered much as you order Beans; the drying of them either in the Kiln or Sun being the best way to preserve them, and likewise to make them fit for the feeding of Cattle; because the drier they are, the more thirsty they make them, it being a general Observation, that if Cattle drink well, they will feed well; but what you keep for Food must not be too much dried, because it will make them take up double the time in boiling.

If you lay them in Granaries, 'tis best to lay them in thick Heaps, or in Binns; for that will preserve them moist the longer; for the spreading of them thin on a Floor dries them too soon, and taketh from them much of their Sweetness and Goodness. But the best way to keep those that you design for your own spending, is to thrash them as you use them, or to put them into close Casks, and head them up.

Oats.

Oats are the least subject to the breeding of Vermin of any Grain, and are defended with a double Husk. The best way to keep them after they are thrashed, is to dry them well either on a Kiln, or with the Sun, and to keep them

them in Hutches, or close Casks, observing that they must not be thrashed before *Christmas*; because they are not fit for keeping before that time.

Barley, if it lie in the Mow unthrashed, *Barley.* will keep well for one Year, but when it is made into Malt, which must be done before the heat of Summer comes on, it must not be kept above a Year and a half, or two Year at most; if you do, it will be filled with Weevels; but if the Weevels do get into it, Wormwood laid in the Malt is a good thing to kill them, and likewise Oak-ashes. Bins are the best things to keep it in.

But if it happen, that you have any Corn by the moisture of the Weather, or neglect of turning, that proves *Musty*; I am told that if you *Musty.* spread it thin on a Cloth, and lay it out all Night in the Dew, and dry it next Day in the Sun, it will make it sweet.

Chap. X. *Of Thrashing and Cleansing of Corn.*

I With some better Methods were found out for the Thrashing and Cleansing of Corn from the Chaff than is; and for those ways that are found out, I think, for the Cleansing of Corn, that in most places the worst way is commonly made use of; which is either a Wicker-fan, or a Fan with Sails: Whereas I am satisfied that one Man with a Casting-shovel which is used but in few places, will cleanse as much Corn in a Day, as four Men with either the Wicker or Sail-fan.

Chap. XI. Of Hemp and Flax.

Hemp and Flax are Commodities that deserve better Encouragement than they meet with amongst us, both for their Usefulness and Profit : But we are got into the way of a Foreign Trade for them, and so are altogether remiss about their Encouragement ; tho' they are what not only deserve the Care of particular Persons, but of the Government too.

Hemp.

Hemp delights in a black rich Mould ; the richer and stronger 'tis, the better, if it be warm and dry. I have known extraordinary Crops of Hemp on Lands where Hay and Wood-stacks have stood. Though where Land is a little sandy or gravelly, provided it be rich and of a deep Soil, it will do well : But it will not thrive on cold Clays, or Land that is wet or moorish. 'Tis very good to destroy all sorts of Weeds ; but as 'tis esteemed a Peeler of Land, 'tis best to sow it upon Lands that are rank, and not to repeat the sowing of it too often upon the same Land.

The best Seed is the brightest, and that which will remain its Colour and Substance when rubbed. Three Bushels will sow an Acre. The richer the Land is, the thicker it must be sown ; and the poorer the thinner. Some do not give the Land a plowing till just they sow it ; but others order it as for Barley ; and when they sow it, they make the Mould very fine like Garden-Ground : And they observe not to lay it too deep in the Ground, but to cover it as lightly as they can. From the beginning to the end of April, is the time of sowing of it, according

as the Spring falls out earlier or later, but the earlier 'tis sown, the better; if 'tis a dry time, it must be carefully preserved from the Birds who are very greedy Devourers of the Seed.

The Season of pulling of it is first about *Lammas*, when a good part of it will be ripe; that is the light Summer-Hemp that bears no Seed, which is called *Fimble-Hemp*: When 'tis ripe the Stalks grow white, and the Leaves fall downwards, turning yellow at the top; it must then be pulled forth, dried, and laid up for Use. You must be cautious not to break what you leave, lest you spoil it, because 'tis to grow till near *Michaelmas*, before it will be ripe: This is usually called *Karle-Hemp*. When you have gather'd it, bind it up in bundles; the *Fimble-Hemp* in small Bundles as big as may be grasped in both Hands; and the *Karle-Hemp* in bundles of a Yard compass (according to Statute-measure) which some lay in the Sun three or four days to dry, and then stack it up, or house it, so as to keep it dry, till they can thrash out the Seed. An Acre of Hemp in the best Land commonly yields about two or three Quarters of Seed, and the Seed with the Hemp unwrought is worth often from five Pound to eight Pound, but if wrought, from ten Pound to twelve Pound, or more. But the *Fimble-Hemp* is not worth above half so much as the other. 'Tis a very great help to the Poor, the Hemp-Harvest coming after the other Harvest, affords them continual Employment in the bad, wet Winter-seasons, and to such as are not capable of better Work.

Chap. XII. Of Flax.

FLax is also a very excellent Commodity: The tilling and ordering of which is a very good piece of Husbandry : It will thrive in any good found Land whatsoever, but that is the best for it that hath lain long unplowed; and the best and richest Land yields the best Flax, and makes the best Improvement : But as it robs the Land much, so the rankest Land and the seldom sowing of it upon the same Ground is best (as was said before of Hemp.) The Land must be well plowed, laid flat and even, and the Seed sown in a warm Season; about the middle of *March*, or beginning of *April*, is the common time for the doing of it: And if a wet Season happen, it will require careful Weeding. Some commend the Feeding of Flax with Sheep, when 'tis a good height, and say they will eat away all the Weeds and Grass, and do the Flax good; and if they should lie in it, and beat it down or flatten it, it will rise again the next Rain.

The best Seed is that which comes from the East Country, although it cost dear; it will last well two or three Crops, and then must be renewed again: Of the best sort of Seed two Bushels will sow an Acre; but there must be more of other Seed: You must be careful that it grow not over ripe; it ripening something after the Hemp, must be pulled as soon as you see the Seed begin to grow brown and bend its Head downwards; at which time let the Pluckers be nimble, and tye it up in handfals, setting them up till they be perfectly dry, and then

then house them. If Flax is pull'd when 'tis in the Bloom, it will be whiter and stronger than if let stand till the Seed is ripe; but then the Seed will be lost.

But the Method and Way of Watering, Pilling, Braking, Tew-tawing, &c. of Hemp and Flax, being a particular Business that requires them that are used to it, and have knowledge in it, I shall leave it to such as are experienced in it, and only note that in *Nottingham* and *Derbyshire*, where a great deal of Linen is made, they have a good way to save the laborious Work of beating of Hemp, by making the Axle-tree of their main Wheel of their Corn-Mills longer than ordinary, and placing of Pins in them to raise large Hammers like those used for Paper and Fulling-Mills, with which they beat most of their Hemp.

Chap. XIII. Of Rape and Cole-seed.

Rape and Cole-seed is another excellent piece of Husbandry and Improvement of Land, especially Marshy or Fenny Lands newly recovered from the Sea, or any rich rank fat Lands; the ranker they are the better: But they will do well on any Lands that are dry and warm. The best Seed is that which is biggest, fairest, and of a clear Colour like the best Onion-seed, and dry; 'tis usually brought from *Holland*; but a great deal that is very good grows here. Unless the Seed be kept dry, 'tis apt to mould.

The time of sowing of it is about *Midsummer*, or in the Month of *July*. The Land being fallowed in *May*, must be twy-fallowed in
June,

June, and made very fine, and laid even before 'tis sown. They observe to sow the Seed the same day they plow up the Land. About a Gallon or four Pound will sow an Acre. 'Tis sown for two Uses; for the Seed, or for Winter-food to feed Sheep, Cows, &c. in *January*, *February* and *March*, when other Food is wanting; for which use it turns to great advantage in the more ordinary sort of Lands, it being only in the richest Lands, that 'tis best to be kept for Seed, because it there grows rankest and strongest: If 'tis fed one Winter, if the Winter be mild, it often produces a good Crop next Year too. And when it hath been cut, the Stubs of it will sprout again, and afford excellent Nourishment for Sheep: Only when Sheep are first put into it, care must be taken for the first four or five Nights to put them out into some Grass-grounds, because Coles are apt else to make them swell, and to fill them with Wind like Clover. When it is cut for Seed, they commonly reap it, as they do Wheat; and when one half of the Seed begins to look brown, is the time to cut it: They lay two or three handfuls of it together to dry, which commonly takes up near a Fortnights time, during which it should not be turned, lest the Seed shed, which 'tis very apt to do: And therefore when they gather it, they do it carefully into large Sheets, in which they carry it into the Barn, and thrash it out immediately: But in *Lincolnshire* they commonly thrash it in the Field upon a large Sheet, having under it levelled a piece of Ground for that purpose. Its common Produce, where it is good, is five Quarters upon an Acre, which is usually sold for about five Pound. The common use of

the
of it is
parer o
Northan
as wha
ter pre
colnshir
Ovens,
scarce
ter use
with t
to be
mix th
Calves
Milk,
come
burn
feldon

T
that
Turn
dens,
sown
Kitch
when
mello
other
will
at tw
run
sow
Oil
sum

of it is to make Oil : 'Tis a very good Preparer of Land for Barley or Wheat. But in *Northamptonshire* they commonly prefer Oats, as what does best after it on their Lands. After pressing out of the Cole-feed for Oil in *Lincolnshire*, they burn the Cakes to heat their Ovens, and for other uses, firing being there scarce ; but in *Holland* they make a much better use of them, which is to feed their Cows with them in Winter, when other Food is hard to be met with, and in *Northamptonshire* they mix the Powder with Water, and give it their Calves from three or four days old instead of Milk, which they do very well with till they come to eat Grass or Hay ; and they often burn the Stubble, it being so stumpy that they seldom plow it in.

Chap. XIV. Of Turneps.

Turneps are of three sorts ; the round which is the most common ; a long sort that grows much in *Suffolk*, and the yellow Turneps : These are commonly sown in Gardens, but are of very great advantage to be sown in Fields, not only for the use of the Kitchen, but for Food for Cattle in Winter, when other Food fails : They love a warm, mellow, light Land, that is rather sandy than otherways. A Pound and a half or two Pound will sow an Acre. They are commonly sown at two Seasons of the Year ; in Spring for to run up to Seed that Summer, which is used to sow again, or to mix with Cole-feed to make Oil of, where they have a quantity ; or at *Midsummer*, the Land being first plowed in *May*,
and

and twy-fallowed in *June*, and made very fine. The Seed being harrowed in with a Bush, they rowl the Land with a wooden Roll to break the Clods ; and with the Turneps sowed at this time of the Year they feed Sheep, Milch-Cows or fatting Cattle, about *January*, *February* or *March* : But for fatting Cattle they commonly in *Suffolk* give the Turneps to them in the House, which they pull up, and carry to them twice a Day, either in a Wheel-barrow or in a Cart, according to the Number of Cattle they have. They used to cut them in small pieces, which now they find an Inconveniency in, because the Cattle were apt to swallow them without chewing, which often choaked them ; and therefore they now give them whole. In feeding of Cattle with them in the House, they propose two advantages ; one is, that it prevents the Cattle spoiling of them with their Feet ; and the other is, that they reckon the Cattle so kept up, do fat much sooner and better than those that ramble about. Hogs also will eat them, if they are first boiled, only you must observe, that what Cattle you fat with them, for about a Fortnight before you kill them, they must be fed with Hay or other Provender to prevent their Flesh from tasting of the Turnep. They are a very great help in dry barren Lands, and will grow almost in any sort of Ground ; only the Fly is sometimes apt to eat them at their first coming up ; but if they do, there is no great loss in sowing of them again, the Seed being so cheap, and so small a quantity sowing of an Acre. But to prevent the Fly, some propose to sow Ashes with the Seed, and others to sow Soot just at their first coming up ; but I have not experi-

enced

th
enced
wife a
times
way i
which
done i
no hur
Someti
if you
into it
cannot
Year v
them.
will h
the ch
fore i
be thi
a Man
monly
becaus
over,
If too
cause t
is a
and tr
help t
their
only
late in
or fatt
on La
then
scarce
Year,
then y
Hardn
ther th

enced the benefit of these ways. There is likewise a black sort of Caterpillar that doth sometimes eat them: which if you find, the best way is to rowl them with a wooden Roller, which will crush them to pieces; especially if done in a dry time, and will do the Turneps no hurt, but rather make them root the better. Sometimes they are eaten with Grubs, which if you find your Land subject to, turn Ducks into it, who will eat them; and if the Ducks cannot destroy them, sow your Land the next Year with Oats, and the Grubs will not hurt them. If your Turneps come up too thick, it will hinder the growth of the Root, which is the chief part to be taken care of; and therefore if they come up too thick, they should be thinned with a Hoe; for which work, where a Man hath Fourteen-pence a day, they commonly give from four to nine Shillings an Acre; because this Work they sometimes do twice over, if the Turneps thrive and flourish much. If too much Wet, or the Richness of the Ground cause them to run too much to Leaves, which is a fault in Turneps, the feeding of them, and treading down some of the Leaves, will help their rooting. Some sow them upon their Stubble as soon as the Corn is off, and only harrow them in, and reserve them 'till late in the Spring for food for Ewes and Lambs or fattening of Cattle; especially if you sow them on Land that you design to fallow, you may then reserve them till *April*, which is the scarcest time for Food for Cattle of the whole Year, especially for Sheep and Lambs; but then you must have a mild Winter: And if the Hardness of the Winter should spoil them, neither the loss of Seed nor Labour will be much.

Many

Many sow Cole-feed and Turnep-feed together, which do very well, because the Profit of the one lies in the Tops, and of the other in the Roots.

If you have Garlick comes up amongst your Turneps, before your Garlick blows, tho' your Turneps are young, you may turn Sheep into them; and they will only eat the Garlick, and not the Turneps.

If you steep your Turnep-feed in an equal mixture of Soot and Lime, and as much Urine as may serve to cover the Seed, I am told, it will prevent the Fly eating of it. You may steep it twenty four Hours.

You may also sow Turnep-feed any time in Winter, or with your Barley when you roll it, or just before you mow your Barley; for the treading and carting on the Land will cover it.

Or, You may have a Roll stuck full of small Pegs, with which you may roll your Land, and sow it with Turnep-seeds, harrowing of it over with a Bush. This, I am told, is a very good way of sowing of it.

Chap. XV. *Of Madder.*

Madder is esteemed a very rich Commodity, and what will turn to good profit; so that in King *Charles* the First his Time it was made a Patent Commodity. 'Tis used by the Dyers for making of the most solid and richest red, and by the Apothecaries for its Medicinal Vertues. There is but one kind of Madder that is manured and fit for use, though there are many things like it, and that

that a
grafs,
wort:
trailing
every
in man
top of
after w
green:
intang
it is g
'Tis in
like Iv
it bear
is raise
Garden
is the
spring
be care
every
going
the ma
taken
and fe
in a v
two fu
ing ev
way:
kept c
gin to
weedin
stery o
Sallet-
things
case a
room.
to Per
VO

that are reckoned a wild sort of it as, Goose-grass, Ladies Bed-straw, Woodroof and Cross-wort: The right sort hath long Stalks and trailing Branches, rough and full of Joints, every Joint being set with green rough Leaves, in manner of a Star: The Flowers grow at the top of the Branches, of a feint yellow Colour after which comes the Seed, which is round and green: The Root creepeth upon the ground, intangling of one Root into another; and when it is green and fresh, is of a reddish Colour: 'Tis small and tender, and runs on the Earth, like Ivy along a House or Tree; and though it bears a Seed, it comes to no Perfection, but is raised out of Setts, which may be had of the Gardeners about *London*. In *March* and *April* is the time of getting of them, as soon as they spring two or three Inches out of the Ground; be careful to have them well rooted, and that every Sett have some Suckers or Spines of Roots going out of them. They must be slipped from the main Root, and as soon as ever they are taken up, put into a Basket with a little Mould, and set as soon as they can. 'Tis to be planted in a very rich, deep, warm Mould, digged two full spits deep, and raked very fine, planting every Sett about one Foot asunder every way: And if it be a dry Spring, they must be kept continually with watering until they begin to sprout, and be continually kept with weeding and hoeing in till it hath got the Mastery of the Weeds. You may sow some early Sallet-Herbs, as Radishes, Onions, or such things as will be ripe betimes, amongst it. In case any Setts die, you must set new in their room. The time of its growing till it comes to Perfection is three Years: The first Year

you may take off some few Setts here and there, but that is something dangerous; but the second Year you may take off what Setts you will, if you leave but the main Root: In the taking up of every Root there will be one Runner, which hath little Buds on it, which may be divided and cut into a Fingers length; so that each Sett be planted with one Bud out of the Ground, one Runner will make many Setts; but these Setts cannot be taken up till the Madder be taken away: And having preserved it until it come to a good Crop, and dried it as you do Hops, to a just and perfect Gage of Drought, you must pare off the Husks of the outside (in which there is an Art) which will be worth not above nine or ten Shillings a hundred, which they call Mull-Madder; but the second Sort called Number O, which is the middle Kind, is much better, but not so good by a sixth Part as the third sort, which is called the Crop-madder, which is the Heart and Pith of it, inclining to a yellow Colour. Sometimes the best Madder is worth eight or nine Pounds a hundred, and the Number O six Pound Ten Shillings, and sometimes not above four or five Pounds a hundred. The Dyers use great quantities of it; many of them an hundred Pounds worth in a Week: So that if it were more propagated, there would be vent for it. Some tell you of two or three hundred Pounds made of an Acre of Land planted with Madder in three Years time.

W taking
the Fo
all sad
that is
or sand
rested
den Ea
'tis sow
contin
used, i
over-m
rank.
plowed
broke,
off. I
The ti
or mid
weeder
the le
ing of
ripe w
and
Green
someti
moist.
be dor
Good
five o
four;
let it
they

Chap. XVI. *Of Woad.*

WOad or Wade is a very rich Commodity, and worth the Husbandman's taking notice of; 'tis used by the Dyers to lay the Foundation of many Colours, especially all fad Colours. It requires a very rich Soil that is dry and warm; if it be a little gravelly or sandy it will do well, and if it have long rested and be in heart; but the richest Garden Earth near great Towns is the best, tho' 'tis sown in many other places. If 'tis long continued, it robs Land much, but moderately used, it prepares Land for Corn, abating the over-much Fertility of it where Land is too rank. The Land for this Seed must be finely plowed, harrowed, and all the Clods and Turfs broke, and the Stones picked up, and carried off. I should think burning of them better. The time of sowing it is about the beginning or middle of *February*. 'Tis continually to be weeded; but if it come up good, it will need the less weeding. The common price of weeding of it is about Eight-pence an Acre. 'Tis ripe when the Leaf comes to its full growth, and retains its perfect Colour and lively Greenness, which is sometimes sooner and sometimes later, as the Year proves dry or moist. As soon as 'tis fit to cut, let it speedily be done, that it may not fade nor wax pale. Good Woad may yield in a plentiful Year five or six Crops; but it ordinarily yields but four, sometimes but three: Especially if you let it grow for Seed; what grows in Winter they do not use, but 'tis very good Food for

Sheep : The two first Crops are the best, which are usually mixed in the seasoning; the latter Crops are much the worse, which, if mixed with either of the former Crops, spoil the whole.

When it is cut it must immediately be carried to the Mill; the manner whereof, with the way of ordering it, is best learned from experienced Workmen, and is not to be trusted to from a bare Description of it. It many times sells from six Pounds to thirty Pounds a Tun, an Acre commonly yielding about a Tun. They commonly sow Woad upon a lay, which they plow into high Ridges, except 'tis very dry Land, and harrow the Turf, till they break them to pieces, and pick out all the Grass-weeds and lumps of Earth, which they fling into the Furrows to rot. I should think burning of them better. The best time of sowing of it is about the beginning of *February*, 'tis apt to be spoiled by the Fly and Grub; but being early sowed, it escapes the better, and they have the better opportunity of setting more, if the Grubs or Flies kill any of it, which they do by making of Holes with a Stick about seven or eight Inches asunder, and putting five or six Seeds into each Hole. They never sow it but two Years upon one piece of Land; and in plowing of it up, and sowing of it again, they pick up all the old Roots as they harrow it, except what they design for Seed, which they let stand to Seed the next Year; it many times produces fifty Quarters upon an Acre. They always keep a good quantity of Seed by them to plant the Ground with that fails; the Seed will grow at two Years old, as well as at the first: And if they sow

sow or
hard,
sow it
Quere
is prop
may r
well as

Cha

W
ing the
many
barren
of Lan
it requ
with B
with a
greate
being
an Acr
but aft
and th
Crop.

You
of it, t
and th
der-rip
'Tis to
fuls, a
house
which
March
it as d
ten Sh

sow or plant it late, if the Ground is dry and hard, they steep it in Water a day before they sow it, which causes it to come up the sooner. *Quære*, if 'tis steeped in the same Liquor that is proposed for the steeping of Turnep-feed, it may not prevent both the Fly and Grub, as well as in the Turnep.

Chap. XVII. *Of Weld or Dyers-weed.*

WEld or Would is a rich Dyers Commodity, and is of great Advantage, considering the easie Charge of raising it. It grows in many places wild, and will grow upon the barrenest sort of Land, tho' the middling sort of Land is best for it. If it be dry and warm, it requires no Tillage. The Seed being sowed with Barley or Oats, and only harrowed in with a Bush, or rolled with a Roller. The greatest difficulty is the sowing of it even, it being a small Seed. A Gallon of it will sow an Acre. It grows not much the first Summer; but after the Corn is cut it must be preserved, and the next Summer you will receive your Crop.

You must be very cautious in the gathering of it, that the Seed be not over-ripe to fall out, and that neither the Stalk nor Seed be under-ripe; because if 'tis, both will be spoiled. 'Tis to be pulled and bound up in little handfuls, and set to dry, as you do Flax, and then house it carefully, that you spill not the Seed, which may be beat out presently, or kept till *March*; only you must take care to keep it as dry as you can. The Seed sells for about ten Shillings a Bushel, or more. The Dyers use

it for dying of bright yellows and Limon-Colours. 'Tis much sown in *Kent*, especially about *Canterbury*, and often yields from forty Shillings to ten or twelve Pounds an Acre.

Chap. XVIII. Of Liquorice.

Liquorice delights in a warm, rich, black Earth, that is well dunged and very deep; because in the length of the Root consists the greatest advantage: And therefore 'tis much planted near *London* and some other great Towns where is plenty of Dung; though the most noted Places are *Pontesraff* in *Yorkshire* and *Godliman* in *Surrey*, which is pretty much of a sandy Soil; only it may be much improved near the Town by Dung, which may make it a rich Garden-mould. The Land for Liquorice must be trenched very deep, at least three Spits or more, and laid as light as possible it can be. The best way is to dig the Dung in the beginning of Winter, and then to dig it again at planting time, which will lay it much the lighter, and mix the Dung the better: The oldest Dung, that is almost turned to Mould, being the best for this use.

Procure your Setts from the best and largest Liquorice: The best Setts are the Crown Setts or Heads got from the very Tops of the Root: The next sort are the Runners, which spread from the Master-roots, and have little Sprouts or Roots to them, which being cut four or five Inches long make excellent Setts; the Branches also may be slipped and planted; and if it prove a wet Year, they will many of them grow

grow
they a
The
in Feb
by a J
holes
tain t
foon
ent of
are re
Earth
before
as foo
days,
Withe
the G
tice a
The
in No
three
will
the be
it wil
had g
The h
tage.
hund
some

E
mate
found
made

grow and serve to thicken your Plants when they are thin.

The usual time of planting of Liquorice is in *February* or *March*, which they set in Rows by a Line at about a Foot distance, making holes with a Setting-stick deep enough to contain the Plant; which you must earth up as soon as you can, because the Setts are impatient of being planted; and therefore where they are removed far, they should be carried in Earth, and the Ground should be made ready before-hand. If the Earth is dry, water them as soon as set, which continue to do several days, 'till you find they have recovered their Witheredness. The first Year you may sow the Ground between them with Onions, Lettice and such like Herbs.

The time for digging of the Liquorice up is in *November* or *December*, after it hath stood three Summers; for then it weighs most, and will keep best; but the sooner 'tis dispos'd of, the better; because while it is green and new, it will not lose of its weight. Some that have had good Liquorice have gained much by it. The better the Land is, the more is the advantage. There have been made from fifty to a hundred Pounds of an Acre of Liquorice, as some affirm.

Chap. XIX. *Of Saffron.*

ENglish Saffron is esteemed the best in the World, and is a Plant that suits our Climate and Soil. It delights in a good, dry, sound Land brought into perfect Tillage, and made mellow by Manure and good Husban-

M 4

dry:

dry: The lighter and richer your Land is, the better Crop you may expect. The time of planting it is about *Midsummer*; some say that *March* is the best time. It is increased by the Roots, which yearly multiply in the Ground like other Bulbous Roots, or rather more. They are to be taken up and new planted once in three Years, and then many of the Roots may be obtained, which they commonly sell by Bushel. The way of setting them is in Ranges, which they make with a large Hoe about two or three Inches deep, like a Furrow; in which Ranges they set the Roots two or three Inches asunder, but the Ranges are four or five Inches distant for the more convenient weeding and hoeing of them: And after one Range is set, they begin another, and with the Earth of this second Range they cover the first, and so continue their Work till finished, making each Range or Furrow as near as they can of a depth.

About *September* the Flowers appear like a blue *Crocus*, and in the Middle of it come up two or three Chives which grow upright, when the rest of the Flowers spread abroad; which Chives are the Saffron, which you must gather gently with your Finger and Thumb early in a Morning, or else it will return into the Body of the Flower again, which you may continue to do for about a Months time; for which Work you must provide as many Hands as the Quantity of the Land will require. You may gather two or three Crops, and then remove it to fresh Ground. After it hath done flowering, it remains green all the Winter; but the tops in the beginning of Summer die wholly away to all appearance, which time is one of the chief Seasons for hoeing it.

Care

Care must be taken in the drying of it, which may be done in a small Kiln that consists of an oaken Frame, lathed on every side, twelve Inches square in the bottom, and two Foot high, and two Foot square at the top; upon which is nailed a Hair-cloth strained hard by wedges drove into the sides with a square Board, and a Weight of about a quarter of a hundred to press it down: The inside of the Kiln is covered all over with Potters Clay very well wrought with a little Sand, a little above two Inches thick: The bottom must be lined with Clay four or five Inches thick, which is the Hearth to lay the Fire on, wherein must be a hole to put in the Fire. The outside may be plaistered over with Lime and Hair. It must be dried with a very small Fire, and will require constant Attendance: Three Pound of it most usually produces one Pound dry; and an Acre of Land may bear from seven to fifteen Pound, and is commonly sold from twenty Shillings a Pound, to five Pounds a pound, as the Markets happen. They commonly compute the Charges of it at four Pounds an Acre, which gives room for a considerable advantage.

In *Oxfordshire* about *Norton* and *Ashton* grows *Safflow*. a sort of Herb that they call *Safflow* or *Bastard Saffron*, which the Dyers use for the dying of Scarlet, which they plant in rows about a Foot distant for the Conveniency of hoeing it. It grows upon a round Stalk three or four foot high, and at the top bears a great open stalky Head, out of which are thrust forth many Gold-colour'd Threads of a most shining Colour, which they gather every day as they ripen, and dry them.

Chap. XX. Of Hops.

Hops are a very valuable Commodity ; only as they require a great deal of Care and Industry, so few make that Profit of them that they might. There are four sorts of Hops, the wild Garlick Hop, the long and square Garlick, the long white and oval : The first sort are not worth the Care, the second are valuable, but by reason of the redness towards the Stalk, are not so beautiful, and therefore do not yield so good a Price. The long white are the most beautiful, being longer than the oval, and produce a greater quantity ; both of them grow well together. They delight most in rich black Garden-mould that is deep and light, and that is mixed rather with Sand than Clay.

In *Essex* moory Land is thought to be the most proper, tho' several other sorts of Soil are esteemed very good. That which I have observed to be the best is a rosselly top, and a brick earthy bottom. In general, a true Rossel or light Land, whether white or black, is what they are usually planted in. And as to moory Land, 'tis of different sorts, some being lighter, and of so small a weight, that when dry it blows away with the Wind ; and others more fixed and heavy, so as in Summer to crack, as other heavy Lands and Clays will do ; and some are of a mixed Nature, so as to be compos'd of both. All these sorts are generally found in moory Lands, if any quantity of them are digged up. These Moors few know the Value of, because they are unwilling to search

search into the bottom of them, by reason of the great Expence of doing of it, and their not knowing how to carry off the Water. These Moors, for Goodness and Value, being according to the Nature and Disposition of the Soil underneath them, which being flung up upon the Surface, makes a good Mixture, it being best to fling the under Soil downward for Hops, because they naturally root downward, sometimes four or five Yards deep, where they like the under Soil; and therefore the deepest and richest Soil is the best for them. But,

If your Ground is moist it should be laid up in high Ridges, and be well drained, and the Drains kept clear and open, especially in Winter, that the Water do not rot, or too much chill the Roots of the Hops. Most sorts of Lands will do for them, unless stony, rocky, or stiff Clays, which are not to be commended for the Hop. In *Kent* they reckon new Land best for Hops, and therefore they plant their Hop-gardens with Apple-trees at a large distance, and with Cherry-Trees between; that when the Land hath done its best for Hops, which they reckon it will in about ten Years, the Trees may begin to bear; the Cherry-Trees last about thirty Years, and by that time the Apple-Trees are large they cut down the Cherry-Trees.

Where Land is any thing sowre or cold, burning of it is a very great help to it; and if the Haum and Strings of the Hops be burnt every Year, and some of the paring of the sides of the Garden or other Earth be laid on them as they burn, and then more Haum laid over them, and so continued Layer upon Layer, it will make excellent Compost to make the Hills with:

with : If you can obtain a piece of Land a little inclining to the South, that lies low and warm, and that is defended by Hills or Trees from impetuous Winds, and where such a Fence is wanting, may be planted with shelter, and that is of a deep Soil, and where Water may be at command in Summer-time, it is the best piece of Ground for a Hop-Garden.

*To prepare
the Land.*

The Ground you design to plant must the beginning of Winter be plow'd or digg'd up, and laid very even ; cross which stretch a Line in which Knots are tied at such distances as you design your Hills. Some plant them in Squares, Chequerwise, which is the best way, if you intend to plow with Horses between the Hills ; others plant them in form of a Quincunx, which is the more beautiful to the Eye, and better for the Hop, and will do very well where the Ground is but small, that you may overcome it with the Breast-plough or Spade : But which way soever it be, pitch a small Stick at every place where there is to be a little Hill ; and when it is so done, if your Ground be poor or stiff, or not rich enough, bring into it the best Mould you can get, or Dung and Earth mixed together, and at every Stick dig a Hole of about a Foot square ; fill it with your Mould or Compost, and setting your Plants in it, they will thrive the better, and the sooner come to bear. To dig Land for Hops is worth from 3 *d.* to 4 *d.* a Pole square ; and they reckon that a thousand Hills may be planted on an Acre, and six or seven Plants on each Hill ; which Plants they commonly sell for about 8 *d.* or 9 *d.* a hundred, which they give 10 *s.* an Acre to plant.

There

There is a great Variety both in the Judgment and Practice of most Men about the distance of the Hills, by reason of the different Seasons of the Year, as being too dry or moist. If your Ground be dry and burning, about six foot may be a convenient distance; but if it be a moist deep, rich Soil, subject to bear large Hops, then eight or nine Foot is the most convenient; and so, according to the Goodness of the Soil, you must place the distance of the Hills, where you have a new Ground to plant; but in an old Ground, if your Hills are too far asunder, the best way to remedy that Inconvenience is by increasing the Number of the Hops in the Roots in each Hill, by which means you may apply more Poles, for Hills may be made of that bigness to require six, ten or twenty Poles; and if your Hills are too near together, you may also abate Hops, and apply the fewer Poles; for over-poling of a Ground, as well in number as height, injures it more than under-poling.

Some advise the planting of Hops in the end of *March*, or in *April*; but the best experienced Planters prefer *October*, before the Cold of the Winter, and say, that then the Hops will settle and strike Root against Spring. Choose the largest Setts you can get, which are to be had best out of Gardens well kept, and where the Hill have been raised very high the precedent Year, which increaseth the Plants both in Number and Bigness. Let them be about eight or ten Inches long, and have three or four Joints or Buds. Before you have your Setts out of the Ground, make the Holes ready to put them in if you can, else you must lay them in cold moist Earth, and take them out as you have

Time of
Planting:

have occasion for them. Dig your Holes according to the depth of your Plants, eight or ten Inches deep, and about a Foot over. Some take two or three of the Plants and join them together with one hand, while they fill the Hole with fine Mould prepared and made ready for that purpose, observing to set the Tops even with the Surface of the Earth, and the same end uppermost that grew so before, and then they fasten well the Earth about the Roots. Others place at each Corner of the Hole a Plant, which way is to be preferred before the other. It is convenient to raise the Earth two or three Inches above the Setts, unless you plant so late that the green Sprigs are shot forth; then you are not to cover them wholly, lest you spoil them. Beware of wild Hops, which are only discovered by the Stalks and Fruit. Great Care must be taken to keep your Hops well hoed, so as to be clear of Weeds, that they do not draw away the Heart of the Land. This Work must be renewed as often as the Weeds get up. The price of Hoeing of Hop-ground is 4 s. an Acre, and to make up the Hills 2 s. an Acre.

*Dressing of
Hops.*

If your Hops are old and ill-husbanded, or worn out of heart, then about the beginning of Winter dig about them, and take away as much of the old barren Earth as you can, and apply good fat Mould or Compost to their Roots: if you cannot do it so soon, do not neglect it longer than *January* or *February*, if the Weather be open, such Winter-dressings being a principal Renewal of decayed Hops; it will likewise kill the Weeds, Quitch-grass, &c. But if your Hop be in good heart and strong, dressing of them in *March* is most proper: Some

Some do it in the beginning of *April*; it will restrain their too early springing, which is the cause of many Injuries to the Hops, and kills the Weeds the better.

In dressing of Hops you must pull down your Hills, and undermine them round about till you come near the principal Roots, and then the upper or younger Roots. Shake off and remove the Earth away from them with your hand; you may see where the new Roots grow out off the old Setts: In the doing of which, be careful of the old Setts; but for the other Roots, they are to be cut away. You shall not need to spare them to the delay of your Work, except such as you mean to set; and take heed that you uncover not any more of the Tops of the old Setts in the first Year of cutting: And at what time soever you pull down your Hills, do not cut your Roots till *March*. When you first dress your young Hops, cut away all such Roots or Sprigs as grew the Year before. Cut off your Setts within one Inch of the same. Every Year after you must cut them as close as you can to the old Roots, but to a weak Hop some of the chief of the new Shoots are to be left at dressing; the not observing of which hath often much decayed a Hop-garden. The Roots that grow downwards are not to be cut, 'tis only those that grow outward at the sides of the Plant that are to be meddled with, because they will else incumber the Ground. The old Roots and the young may be distinguished, in that the first are red, and the latter white. If there are any wild Hops, you must take up the whole Hill and new plant it, marking the Hill with a Stick at Hop-harvest-time to prevent Mistakes. When you

you have dressed the Roots, apply your rich Mould or Compost to them, and make not the Hills too high at first, lest you hinder the young Shoots: And if the Hops are springing out of the Hills you need not fear cutting them off when you dress them; and be sure to keep all Poultry out of the Hop-ground, especially Geese.

*Poling
Hops.*

The Number, Length and Bigness of the Poles are to be provided according to the distance of the Hills, Nature of the Ground, and Strength of the Hops. If the Hills are wide, there must be the more Poles, sometimes four or five to a Hill; if the Hills are near, two or three may suffice. In hot, dry, hungry Ground the Poles may stand nearer than in rich mellow Land, where they are more subject to grow gross and heavy. Also if your Hops be strong, and your Ground rich, provide large Poles either in Bigness or Length, or else you will lose the best of the Profit for want of Poles; but if they are poor, provide but small Poles, lest you impoverish the Root; for the Hop will soon run it self out of heart if over-poled; more especially be sure not to over-pole them for length the first Year. Ash and Alder-poles are reckoned the best; and if they have a small Fork at the end, it will keep up the Hop the better. Disperse your Poles between the Hills before you begin to pole, and begin not to pole till your Hops appear above the Ground, that you may discern where the biggest Poles are required, and so you may continue poling till they are a Yard in height or more; but stay not too long, lest you hinder the growth of the Hop, which will not grow large unless it have a Pole or such like to climb up on.

Set

Set
cord
the
that
the
from
an
as
South
mong
or be
right
serve
to sup
they
ram
its be
some
under
anoth
nothe
one P
Ho
Twen
Comp
shoul
dressin
The
three
Dung,
to Ho
Poles,
it, exc
3 l. to
Wh
high,
you thi
VOI

Set the Poles near to the Hill, and in depth according to the height of the Pole, Nature of the Ground, and to its being exposed to Wind, that the Pole may rather break than rise out of the Ground. Let the Poles lean outward one from another, that they may seem to stand at an equal distance at the top to prevent Houpling as they call it; and let them lean towards the South, that the Sun may the better shine amongst them: For 'tis evident that a leaning or bending Pole bears more Hops than an upright one. Always have some spare Poles in reserve in case any Poles break or be over-burden'd, to support them; for if they lie on the Ground they soon perish. With a Rammer you may ram the Earth at the outside of the Pole, for its better security against the Wind. If after some time of growing you find a Hop over or under poled, you may unwind it, and place another Pole in its Place, or you may place another Pole near it, and bring the Hop from one Pole to another.

Hop Poles the largest sort, should be about Twenty Foot long, and about Nine Inches in Compass, for Hops at full Growth, and they should be Poled about Fourteen Days after dressing in Rich Land.

They reckon that an Acre of Land, requires three Thousand Poles, and about 2 Load of Dung, and to look after a Garden all the Year to Hoe it, to make up the Hills, to stick the Poles, and do all the work that belongs to it, except picking of the Hops, is worth from 3 l. to 3 l. 10 s. an Acre.

When the Hops are got two or three Foot high, they are to be conducted to such Poles as you think fit that are nearest, and have fewest

*Tying of
Hops.*

VOL. I.

N

Hops;

Hops; wind them about the Poles according to the course of the Sun, to which they should be gently bound with some wither'd Rushes or woollen Yarn: Two or three Strings are enough to a Pole. Be cautious of breaking the tender Shoots, which are more tender in a Morning than in the heat of the Day. During *April* and *May* Hops should be constantly tended to guide them to their Poles, which may be done with a forked Stick, or a Ladder with a Stay to the back, where they are out of reach. About Midsummer, or a little after, the Hops begin to leave running at length, and to branch; such as do not, it may be convenient to nip off the top, or to divert it from the Pole, that it may branch, which is much more for the benefit of the Hop than its running of its self out at length.

Sometimes in *May*, after a Rain, pare off the Surface of the Earth with a Spade, Hoe, Breast-Plough, or a Plough with one Horse, and with the Parings raise your Hills high, and enlarge their breadth, burying and suppressing all superfluous Shoots of Hops or Weeds; by which means you will keep the Weeds from impoverishing of your Hops, and keep your Hills moist. This Work may be continued throughout the Summer, especially after Rain.

*Watering
of Hops.*

In a dry Spring, where Water is to be had, 'tis of great advantage to water them: The first watering is best to be done before you lay the Parings of the Garden upon the Hills: If the Summer prove dry, watering be repeated three times; and after every watering make up the Hills with the Parings and with the Weeds to keep the Hops moist, for the more the Hop is shaded from the Sun, the better it thrives, as is evident by such as grow under shelter, that
are

are
those
To
Begin
ripe,
or Be
Hops
easily
to loc
concl
help y
for o
much
Th
down
of the
the C
they
it, an
lay th
this F
Basket
Poles
times
'tis ne
otherw
Hop-
But
which
short
into t
covere
Blank
they
either
the Fr
pick t

are never drest, and yet may compare with those that the most care is taken of.

Towards the End of *July* Hops blow, about the Beginning of *August* they bell, and are sometimes ^{Gathering of Hops,} ripe, in forward Years, at the End of *August*, or Beginning of *September*. At such time as the Hops begin to change colour, or that they are easily pulled to pieces, or that the Seeds begin to look brown, and smell fragrantly, you may conclude them ripe, and then procure what help you can for a quick gathering of them; for one windy Day or Night may otherwise do much mischief.

The Manner of gathering Hops, is to take down four Hills standing together in the midst of the Garden, and to cut the Roots even with the Ground, and laying of the Ground level, they throw water on it, and level and sweep it, and so make a Floor of it on which they lay the Hops to be pick'd. On the outside of this Floor the Pickers sit, and pick them into Baskets after the Vines are strip'd from the Poles: The Floors they clean two or three times in a Day. Always in this way of picking 'tis necessary to have the Poles without Forks, otherwise it will be troublesome to part the Hop-Vines and the Poles.

But the best and most expeditious way, and which is most used, is to make a Frame with four short Poles or Sticks laid on four Forks driven into the Ground, of such a Bigness as to be covered with the Hair-cloth of your Kiln, or a Blanket tack'd about the Edges; on which Frame they lay the Poles with the Vines on them, either supported with Forks or the Edges of the Frames: The Pickers standing on each side pick the Hops into the Hair-cloth or Blanket:

When the Blanket or Hair-cloth is full, they untack it and carry it away, and empty it or put another in its room; which Frame may from time to time be easily removed from one place in the Garden to another, as they find occasion: This way keeps the Hops clean, and saves a great many that otherwise are lost by tumbling them about.

Before you draw your Poles, with a sharp Hook fixed at the End of a long Pole, divide your Hops above where they grow together with other Poles; then ought you to cut the Hops about two or three Foot above, and not close at the Hills, because it occasions the Hop to bleed too much of its Strength away, and weakens them very much. Then draw your Poles; but in case they are so fast in the Ground that they cannot be raised without breaking, you must get a Pair of Tongs like a Smith's Tongs, only stronger, and toothed at the End; with these Tongs taking hold of the Pole, and resting of the Joint thereof on a Block of Wood, you may weigh up the Poles without trouble; or, for cheapness sake, you may have a wooden Lever forked at the Ends, into the sides of which drive some Iron-teeth, which put to the Pole, and by the strength of your Right-hand, whilst you pull the Pole to you with your Left, you may raise it. Cut no more Hops, nor draw any more Poles, than you can conveniently dispatch in an Hour or two in case the Weather be hot or likely to rain.

If your Hop-garden be large, it may be worth while to raise a Shed in the midst of it to shelter the Pickers and the Hops from the Sun and Rain, and to lay Hops in over-night for the Pickers to pick next Morning before the
Dew

Dew
Hops
Dew
and t
be ov
Seed,
Hops
somev
Value
as th
dryin
thorou
Pound
make
more
than
Th
and t
lour b
bearin
Hops
keepin
and S
Sale t
As
their
their
canno
Floor
they
if yo
Num
them
often
bette
of H
taken

Dew is off your other Hops. Let not your Hops be wet when you gather them; but if the Dew or Rain be on them, shake the Pole, and they will dry the sooner. If your Hops be over-ripe, they will be apt to shed their Seed, wherein consists the chief strength of the Hops: Also they will not look so green, but somewhat brown, which much diminisheth the Value of them: Yet some let them stand as long as they can, because they waste less in the drying; for four Pounds of undried Hops, thorough ripe, will make one of dry; and five Pounds of Hops scarcely ripe, yet in their prime, makes but one: So that they judge they get more in the thorough-ripe Hop by the Weight, than they lose in the Colour.

There are also two Sorts of Hops, the green and the brown; the one yielding the best Colour by much when they are dry, and the other bearing a larger and a greater Quantity of Hops, which is to be preferred. In the picking keeping them as clean as you can from Leaves and Stalks, which will damage you more in the Sale than they will advantage you in the Weight.

As fast as you pick your Hops, dry them, for their lying undried heats them, and changes their Colour: But if your Kiln be full, that you cannot do it presently, spread them on some Floor, that they may not lie thick, and thus they will keep a day or two without damage, if you have a great quantity; but if your Number be small, and you have room to lay them very thin, if you take care to turn them often, you may this way dry a small Quantity better than any other way. The well drying of Hops is the most necessary thing to be taken care of; for if that be not rightly done,
N 3 they

they are not fit for the Market, nor for use : For a handful of slack-dried Hops will marr and spoil many Pounds by taking away their pleasant Scent and Colour : Therefore let your Hops be thoroughly and evenly dried : Which to accomplish, there are several ways used ; as first,

Ooft or
Kiln.

The way used by the *Hollanders* and *Flemings*, is to make a square Room or Kiln about eight or ten Foot wide, according as you desire it in Bigness, built up with Brick or Stone, with a door-place at one side : In the midst of the Room, on the Floor, must the Fire-place be made, about thirteen Inches wide within, and thirteen Inches high in length, from the Mouth thereof almost to the back-part of the Kiln, leaving only a way for a Man to go round the End of it. It is usually called a Horse, as is commonly made in Malt-kilns, the Fire passing out at Holes on each-side, and at the End thereof ; every Mason or Brick-layer almost knowing how to make it.

Above five Foot high is placed the Bed or Floor whereon the Hops lie to be dried, which must have a Wall about it four Foot high to keep the Hops up from falling. At the one side of the upper Bed must be made a Window to shove off the dried Hops down into the Room prepared for them. The Beds must be made of Laths or Rails sawn very even, an Inch square, and laid a quarter of an Inch asunder, with a cross beam to support them in the middle, into which Beam the Laths are to be let in even with the top of it, which will keep the Laths even in their places. On this Bed, without any Ooft-cloth, lay your Hops by Basket-fulls, beginning at the one end, and so proceeding till all be covered over half a

Yard

Yard thick without treading on them; then lay them even with a Rake or Stick, that they may not lie thicker in one place than another; and then make your Fire below of broken Poles, or other Wood, say some; but Charcoal is the only Fuel for Hops. You must keep your Fire at a constant Heat and only at the Mouth of the Furnace; for the Air will disperse it sufficiently. The Hops this way are not to be stirred until they are thoroughly dried, which is not until the Tops are dry as well as the Bottom; but if any place be not so dry as the rest (which you may perceive by reaching over them with a stick or Wand, and touching of them in several places) observe where they rattle; and where not, abate them there, and dispose of them where the places were first dry. When they are through dry (which is known by the Brittleness of the inner Stalk if rubbed and it short) then are they enough; at which time take out the Fire, and shove out the Hops at the Window for that purpose, with a Coal-rake made of a Board at the end of a Pole, into the Room made to receive them, and go in at the Door below, and sweep together the Seeds and Hops, that fell through, and lay them with the other; and proceed to lay another Bed of green Hops as before, and renew the Fire.

In several places they dry their Hops on the ordinary Malt-kilns on a Hair-cloth, laying of them about six Inches thick; and when they are almost dry, with a Scoop, made for that purpose they turn them upside down, and let them lie again 'till every Hop, as near as they can be thoroughly dried: And then with the Hair-cloth remove them to the Heap; where they are to lie 'till they be bagged. Both these

*Another
way to dry
Hops.*

ways are subject to several Inconveniences. In the first way, the Hops lie so thick, and never turned, the Under-part of them must needs be dry before the Upper; and the Fire passing through the whole Bed to dry the uppermost Hops, must needs over-dry and much injure the greater part of the Hops both in strength and weight, besides the waste of Firing, which must be long continued to thorough-dry so many together.

In the second way, the turning of the Hops breaks them very much, by forcing of the Scoop amongst them, the rough Hair-cloth frets and spoils many of the Hops, and shatters their Seed; else this way is rather to be preferred before the other.

*Best way of
drying
Hops.*

Which several Inconveniences may be prevented by making the Lower-part of the Kiln as before is described, and the Bed thereof made after the following manner. First make a Bed of flat Ledges about an Inch thick, and two or three Inches broad saw'd, and laid a-cross one another Chequer-wise the flat way, the Distance to be about three or four Inches; the Edges so entred the one into the other that the Floor may be even and smooth: This Bed may rest on two or three Joists, set edge-wise to support it from sinking.

Then cover this Bed with large double Tin solder'd together at each Joint, and so order the Ledges before you lay them, that the Joints of the Tin may always lie over the middle of the Ledge; and when the Bed is wholly covered with Tin, fit Boards about the Edges of the Kiln to keep up the Hops; only let one side be to remove, that the Hops may be shov'd off as before.

On

On this Tin-floor or Bed may the Hops be turned without such hazard or loss as before on the Hair, and with less expence of Fuel; also any manner of Fuel will serve for this purpose as well as Charcoal, the Smoak not passing through the Hops as in either of the other ways: But you must remember to make Conveyances for it at the several Corners and Sides of your Kiln. The saving of Fuel only, besides the advantage your Hops receive, will of it self, in a little time, recompence the extraordinary charge of a Tin-floor.

The turning of Hops, after the most facil and best way, is found to be not only a waste and an injury to the Hops, but also an expence of Fuel and Time; because they require as much Fuel and as long time to dry a small part when they are turned, as if they were almost all to be dried; which may be prevented, in case the upper Bed whereon the Hops lie have a Cover, that may be let down and raised at pleasure: Which cover may be tinned over, only by nailing of single Tin-plates over the face of it, that when the Hops begin to dry, and are ready to turn, that is that the greatest part of the Moisture is evaporated away; then may you let down the Cover within a Foot or less of the Hops, which (reverberatory-like) will reflect the heat upon them, that the uppermost Hop will soon be as dry as the lower, and every Hop equally dried. This is the most expeditious, sure, and least expensive way of drying of Hops, and the costliest and troublesomest part of the Work that belongs to them.

As soon as your Hops are off the Kiln, lay them in some Room three or four Weeks or more, that they may cool, give and toughen ;
for *Bagging of Hops.*

for if they are immediately bagged, they will break to Powder ; but if they lie a while (the longer the better, if they be close covered from the Air with Blankets) you may bag them with the more security.

The Manner whereof is usually thus: Make a hole round or square in an upper Floor, big enough that a Man may with ease go up and down, and turn and wind in it : Then tack on a Hoop about the Mouth of the Bag fast with Pack-thread, that it may bear the weight of Hops when full, and of the Man that treads them ; then let the Bag down through the Hole and the Hoop will rest above, and keep the Bag from sliding wholly through, into which Bag cast a few Hops, and before you go in to tread, tie at each lower Corner a handful of Hops with a piece of Pack-thread to make as it were a Tassel by which you may conveniently lift or remove the Bag when full ; then go into the Bag, and tread the Hops on every side, another still casting in as fast as you require them, 'till it be full : When it is well trodden and filled, let down the Bag by unripping of the Hoop, and close the Mouth of the Bag, filling of the two uppermost Corners as you did the two lower ; which Bag, if well dried and well packed, you may keep in a dry place several Years ; only you must have a care that the Mice do not spoil or destroy them ; not that they will eat them, but make their Nests in them.

In *Hampshire* they sell Water-Trefoil as dear as Hops, and say that it doth upon all accounts as well, and that an eighth part of the Quantity of it as of Hops will do. 'Tis a very wholesome Herb, and esteemd very good for the Scurvy.

After

Aft
return
your
Haw
(like
weigh
and b
you r
please
twiste
the ou
ries o
dry,
some
Haw
your
in, a
In
Hop-
and
you c
parts
mixe
Hills
lie m
very
Du
for H
ten,
no o
Cow
Hori
alaic
best,
whe
best
and

After you have laid by your Hops, you may return again to the Hop-garden to take care of your Poles for another Year. Strip off the Hawm first from them, and set up three Poles (like unto a Triangle wherewith they usually weigh heavy Ware) spreading at the Bottom, and bound together near the Top, about which you may set as many of your Poles as you please; bind them about with a little Hawm twisted to keep them together: By this means the outward Poles are only subject to the Injuries of the Weather, keeping all the inner Poles dry, except only at the Tops: And therefore some lay them on Heaps, and cover them with Hawm: But the best way is, to house them in your Shed, which may serve to preserve them in, and to gather your Hops into.

In Winter, when little else can be done to the Hop-garden, you may then provide your Soil, and Manure against the Spring. If the Dung you carry in be rotten, mix it with two or three parts of common Earth, and so let it lie well mixed 'till you have occasion to make up your Hills. But if your Dung be new, then let it lie mixed 'till another Year; for new Dung is very injurious to Hops.

Dung of all sorts were formerly of more use for Hops than at present, especially when Rotten, and turned to Mould, and they that have no other Manure must use it: and if they do Cows-dung or Hogs-dung is best. If they use Horse-dung or Humane Ordure, it should be alaid with Mud, for Hops love that Manure best, which is cool and moist, and therefore where 'tis to be had I think Chalk or Lime the best Manure, except the Land is very Cold and where it is, no Dung can compare with Pigeons.

Pigeons-dung, a little whereof laid to a Hill, and mixed that it may not be too hot in a place, is of great advantage. Sheeps-dung is also very good. And if in Spring or Summer-time you steep Sheeps dung, Pigeons-dung, or Hens-dung, in Water, till it be quite dissolved; and if when you water your Hops, on the Top of every Hill, in the hollow place made to contain Water, you put a Dish-full of this dissolved Dung, it will prove a most expeditious way, and the least expensive of any, to enrich your Hop-hills. Also by this means you may convey to the Roots of Hops, or any other Plants, the fixed Salt of Urine, of Lime, Athes, or any other fertilizing Subject whatsoever.

An Account of HOPS, By a Kentish Gentleman.

THERE being the greatest Plantation of Hops in Kent of any County in England, I shall give you an Account of the way and manner of planting and ordering them there.

Choice of Ground to plant with Hops. The strongest richest Ground is most proper for them: Chuse a warm dry Soil, that has a good depth of light Hazel Mould; if it be Rocky within two or three Foot of the Surface they prosper well; but by no means on a stiff Clay or spungy wet Land. If it may be, choose to plant on a piece of Meadow or Lay-ground, that has not been till'd or sow'd for many Years, or on an old decay'd Orchard, for Land that is worn out with long bearing Corn, will require abundance of Dung to bring it into any tolerable condition to bear a Crop of Hops.

The

The Situation of it, with respect to the Points of the Compass, is not much material ; tho' an Inclination to *South* or *West*, no doubt, is preferable, where it may be had ; but if the Ground lie exposed to the *North-East* or *South-West* Winds, care must be taken, that there be at some distance a Shelter of tall Trees or Hedges, because the former are apt to nip the tender Shoots in Spring, and the latter frequently break and blow down the Poles, and very much endanger the Hops at the latter End of Summer.

The Situation of the Ground.

In the Winter before you design to plant, plough the Ground and harrow it even ; and if it be Stony, gather up and carry off the Stones ; and lay upon it, in heaps a good quantity of fresh rich Earth or well-rot Dung and Earth mixt together, sufficient to put half a Bushel into every Hole to plant the Hops in, unless the natural Ground be very fresh and good. Then on a straight side of the Field, at a convenient distance from the Hedge, stretch a Line with Knots tied in it, at about 7 Foot distance, the whole length of the Ground, and place a sharp pointed Stick at every knot ; then lay aside the Line, and with two forked Sticks of about 7 Foot long, you may from that first Row set out the whole Ground, by applying the two Forks to two of the Sticks which were first set up ; and placing another Row at the Ends where the forked Sticks meet Triangular-wise : Then at every Stick dig a Hole about a Foot and half wide, and fill it very full of the good Earth you brought in.

How to prepare the Ground for Planting.

You ought to be very curious in the Choice of your Plants and Sets, as to the kind of Hop, for it is a very great Damage to the Planter, when

Choice of Sets.

when his Garden proves a Mixture of several sorts of Hops ripening at several times. The two best sorts are the white and the grey Bind; the latter is a large square Hop more hardy, bears a plentiful Crop, and is something later ripe than the former. There is another sort of the white Bind which is ripe a Week or ten ten Days before the common, but 'tis more tender and bears but a thin Crop; the only Advantage is, it comes first to Market. He that plants three Grounds, or three distinct parts of his Ground, with these three sorts, will have the Convenience of picking them successively, as they become ripe.

Procure your Sets out of the Ground, that is intirely of the same sort you would have; let them be 5 or 6 Inches long, with 3 or more Joints or Buds on them; all the old bind and hollow part of the Set being cut off.

If there be a sort of Hop you value, and would increase Plants or Sets from, you may lay down the superfluous Binds when you tye your Hops, cutting off the Tops, and burying them in the Hill; or when you dress your Hops, you may save all the Cuttings, and lay them in rows in a Bed of good Earth; for almost every part will grow, and become a good Set the next Spring.

Experiments have been made of raising a Hop-garden, by sowing the Seeds, but it turns to no Account; because 'tis not only a tedious way, but the Hops so produced will be of different kinds, and many of them wild and barren.

*Season of
Planting.*

There are two Seasons for planting Hops, in *October*, and *March*, and both succeed very well; only in *October*, Sets are not to be had,

unless

unless from a Ground that is to be digg'd up, and destroy'd, and there is some danger that a wet Winter may rot the Sets. The most usual time is in *March*, when Hops are cut and dress'd.

You ought to plant five good Sets in every Hole with a Setting-stick; place one in the Middle, and the rest round about sloaping, the Tops meeting at the Center; let them stand even with the Surface of the Ground; press them close with your hand, and cover them with fine Earth, and place a Stick on each side the Hill to secure it. *Manner of Planting.*

After your Ground is thus planted, all that you have to do that Summer, is to keep the Hills clean from Weeds, to dig the Ground about the Month of *May*, to gather up the Stones, if more be turned up by digging, to raise a small Hill round about the Plants, and to twist the young Binds or Branches together into a Bunch or Knot about *June*; for if you tye them up to small Poles the first Year in order to have a few Hops from them, it will not countervail the weakening of the Plants.

Having got ready a Mixin of Compost or Dung for your Hop-ground; the best time to lay it on is about *Michaelmas*, if the Weather be dry, that the Wheels of the Dung-cart may not damage your Hops, nor furrow your Ground; otherwise you must stay till the Frost has hardened the Ground, so as to bear the Dung-cart over. And this is the time to carry on your new Poles, to recruit those that are decay'd and cast out every Year. *Dunging the Ground.*

If you have plenty of Dung, the best way is to spread it in the Alleys all over the Ground, and then dig it in the Winter following, which will

will require 80 or 100 Load to an Acre, reckoning about 30 Bushels to the Load. If you have not Dung enough to cover all your Ground in one Year, you may lay it on one part one Year, and on the rest another, or a third; for there is no occasion to dung the Ground after this manner more than once in three Years.

Those that have but a small quantity of Dung usually content themselves with laying on about twenty Load upon an Acre every Year; this they lay only on the Hills, either about *November*, or as some esteem best, in Spring, when the Hops are drest, to cover them after they are cut, but then the Compost or Dung must be very well rotted and fine.

Dressing
Hops.

When you dig your Hop-Ground in *January* or *February*, let the Earth be taken away with a Spade round about the Hills, very near them, that you may more conveniently come at the Stock to cut it. Then in fair Weather towards the end of *February*, if your Hops were planted the Spring before; or if your Ground be weak you ought to dress them; but if your Ground be in perfection and strong, the middle of *March* is a good time; and if it be apt to produce over-rank Binds, the latter end of *March* or the beginning of *April* may be soon enough.

Then having with an Iron Picker cleared away all the Earth out of the Hills, so as to make the Stock bare to the principal Roots, with a sharp Knife cut off all the Shoots which grew up with Binds the last Year, and also all the young Suckers, that none be left to run in the Alleys and weaken the Hill. And it will do well to cut one part of the Stock lower than the other, and the following Year, to cut that

that part low which before you left highest, by which course you may expect stronger Binds, and yet keep the Hill in order.

In dressing Hops that were planted the Year before, you ought only to cut off the dead Tops, and the young Suckers that are sprung from the Setts; and with a Hoe cover the Stocks with fine Earth the thickness of your Finger.

When the Shoots begin to sprout up about the middle of *April*, you are to set Poles to the Hills; they must be set deep in the Ground with a square Iron Pitcher or Crow, that they may endure the Winds; three Poles are enough for each Hill, let them be placed as near the Hill as may be, with their bending Tops turned outwards from the Hill, to prevent the intangling of the Binds; and let a space between two Poles be left open to the South to admit the Sun-beams. *Poling Hops.*

Your Poles ought to be sixteen or twenty Foot long, more or less, according to the strength of the Ground, and take care not to over-pole a young or weak Ground, for that will draw the Stock too much and weaken it; neither can you expect a Crop from an over-poled Ground, for the Branches which bear the Hops grow very little, till the Binds have over-reach'd the Pole, which when the Pole is too long it cannot do, two small Poles are sufficient for a young Ground.

If you wait till the Sprouts or young Binds are grown about a Foot long, you will the better judge where to place the largest Poles; but if you stay till they are so long as to fall into the Alleys, 'twill be a prejudice to them,

because they will entangle with one another, and not so readily clasp about the Pole.

A Hop is thought to prosper best on a Maple or Aspen Pole, because of their Warmth, or because the roughness of the Bark furthers the climbing of the Hop. But the Ashen or Willow Poles are to be preferr'd for their lasting ; and above all, the Chestnut is the most durable.

If after the Hops are grown up, you find any of them undespoled, it will be worth the while to place taller Poles near those that are too short, to receive the Binds from them.

*Tying of
Hops.*

When the Binds are grown two or three Foot high, you must with your Hands guide them that do not clasp of themselves to the nearest Pole, turning them to the Sun, whose Course they always follow, and binding them with withered Rushes, but not so close as to hinder their climbing up the Pole. This you must continue to do till all the Poles are furnished with Binds, of which two or three are enough to a Pole, and then pluck up all the Sprouts and Binds which you have no occasion for ; but if it be a young Ground, pluck up none of the useless Binds, but wrap them up together in the middle of the Hill.

When the Binds are grown beyond the reach of your Hands, if they forsake the Poles, a Stand-Ladder is very useful in tying them up again.

If the Binds be very strong and much overgrow the Poles, some advise to strike off their Heads with a long Switch, to encrease their Branching below.

*Summer
digging.*

When the tying is finish'd, towards the end of May, you must give your Ground the Summer-Digging, casting up with the Spade some fine

fine E
after
vel, a
bigner
The
a thori
vantag
much
cticab
flow t
Wh
them
drivin
that t
Ab
blow,
tholom
ness b
and b
When
the ex
will c
breaki
discol
that H
a thir
lour'd
The
is into
Binn,
withi
This i
ed tog
Prop
of W
the m
are la

fine Earth into every Hill, and about a Month after you ought to pare the Alleys with a Shovel, and make up the Hills to a convenient bigness.

There is no doubt but in a hot dry Summer *Watering Hops.* a thorough Watering would be a very great advantage to Hops; but to do that requires so much trouble and charge, that 'tis scarce practicable, unless you have a stream at hand to flow the Ground.

When the Hops blow, if you find among them any wild or barren Hills, mark them by driving a sharpened Stick into every such Hill, that they may be digged up and replanted.

About the middle of *July* Hops begin to *Picking Hops.* blow, and will be ready to gather about *Bartholomew-tide*; you may judge of their Ripeness by their strong Scent, by their Hardness, and by the brownish Colour of their Seed. When you find them ripe, pick them with all the expedition you can, for a storm of Wind will do them great Mischief at this time, by breaking off the Branches, and by bruising and discolouring the Hops; and 'tis well known that Hops pick'd green and bright, will sell for a third part more than those which are discolour'd and brown.

The most convenient way of picking them is into a long square Frame of Wood called a Binn, with a Cloth hanging on Tenter-hooks within it, to receive the Hops as they are pick'd. This is composed of four pieces of Wood joyn'd together, supported by four Legs, with a Prop at each end to bear up another long piece of Wood plac'd at a convenient height over the middle of the Binn, upon which the Poles are laid to be pick'd. The Binn must be eight
O 2 Foot

Foot long, and three Foot broad, six or eight Persons may work at it, three or four on each side, and two Poles may be pick'd at a time.

If conveniently you can, begin to pick your Hops on the East or North-side of your Ground, which will prevent the South-west Wind from breaking into the Garden.

Having chosen a Plat of the Ground, containing eleven Hills square, place the Binn upon the Hill which is in the Centre, having five Hills on each side, and having pick'd them, remove the Binn into another piece of Ground of the same extent, and so go on till you have finish'd the whole.

When you draw up the Poles to be pick'd, take care not to cut the Binds too near the Hills, especially when the Hops are green, because it will occasion an excessive flowing of the Sap. And if the Poles come up with difficulty, you may raise them with a piece of Wood in the nature of a Lever, which has a forked piece of Iron with Teeth on the inside, fastned within two Foot of the end.

Take care that the Hops be pick'd clean, *i. e.* free from Leaves and Stalks, and two or three times in a Day, if there be occasion, empty the Binn into a Hop-bag made of coarse Linen Cloth, and carry them immediately to the Oast or Kiln to be dried: For if they lie long in the Binn or Bag, they will heat and be discoloured.

If the Weather be hot, draw no more Poles than may be pick'd in an Hour; and if it may be choofe to gather them in fair Weather, when the Hops are dry, which will save some expence of Coals, and will better preserve their Colour when they are dry'd.

The

The best way of drying Hops is with a *Drying Hops.* Charcoal Fire, on an Oast or Kiln cover'd with Hair-Cloth, of the same Form and Fashion which is used to dry Malt on, which every Carpenter or Bricklayer in Countries where Hops grow, or Malt is made, knows how to build; so that little need be said of it. The Kiln ought to be square, and may be of ten, twelve, fourteen or sixteen Foot over at the Top, where the Hops are laid, as your Plantation requires, and your Room will allow. There ought to be a due proportion between the height and breadth of the Kiln, and the bigness of the Steddle where the Fire is kept, viz. if the Kiln be twelve Foot square on the Top, it ought to be nine Foot high from the Fire, and the Steddle ought to be six Foot and a half square; and so proportionable in other Dimensions.

You ought to spread the Hops even upon the Oast a Foot thick or more, if the depth of the Curb will allow it; but take care not to over-load the Oast, if the Hops be green or wet.

Let the Oast be first warmed with a Fire before you lay on the Hops, then keep an even steady Fire under them, not too fierce at first, lest you scorch them; and let not the Fire sink or slacken, but rather increase till the Hops be near dry'd, lest the Moisture or Sweat which the Fire has raised fall back or discolour them: After they have lain about nine Hours, they must be turned, and in two or three Hours more they may be taken off the Oast: When they be well dried is known by the brittleness of the Stalks and the easie falling off of the Hop-Leaves.

*Bagging
Hops.*

They ought not to be bagg'd up hot from the Oast, but laid by in a Chamber for a Fort-night or more, that they may imbibe the Air, and so become more soft and tough, which will prevent their being over-much broken in treading, and make them capable of being trodden closer; and the harder they be trodden, the better they will keep.

The Bags in which Hops are pack'd up are made of coarse Linen Cloath. Four Ells and a half or that which is Ell-wide, makes a Bag to contain two hundred and a half weight of Hops or more. The manner of bagging them is thus: make a round Hole in the Chamber near where the Hops are laid, large enough to receive the Bag, tye a handful of Hops in each lower Corner of the Bag to serve as Handles to it, and fasten the Mouth of the Bag to a Hoop something larger than the Mouth of the Hole, that the Hoop may rest on the edges of the Hole: then put in a few Hops, and let him that is to tread them, go down into the Bag, and going round on every side, let him tread them as hard as he can; keep putting in more Hops as fast as there is occasion, till the Bag be full: Then release the Bag from the Hoop, take it down, and sew up the Mouth as fast as you can, leaving the two upper Corners of the Bag for Handles as before.

If you lay them up, let it not be on an Earthen Floor, but on Boards, and take care of Ratts and Mice, which will be very apt to harbour in them.

*Stacking
the Poles.*

Having strip'd off the Haum or Binds from the Poles as you pick them, your last Work is to stack them up for their Security in Winter. This is done by setting up a Frame of six Poles
let

let in
Crow
dista
when
so inc
ther
Fram
for if
especi
more
stand
As
and
Th
Hop-
and
howe
his Pa
groun
many
or P
If an
Hops
three
of an
per
dry,
and
and
Acres
T
the
Crop
Acci
wher
Loss
Crop

let into the Ground with an Iron Pitcher or Crow in the spaces round about, and at some distance from the Hill on which the Binn stood when you pick'd the Hops; let the Poles stand so inclining as to meet and be ty'd fast together within a Yard of the Top: Against this Frame the Poles ought to be speedily set up, for if they be suffered to lie upon the Ground, especially in wet Weather, they will receive more damage in a Fortnight, than by their standing all the rest of the Year.

As soon as the Hawm or Binds are withered and dry, burn them on the Ground.

Thus you see, *Redit labor actus in orbem.* A Hop-ground requires almost constant Labour and Attendance throughout the whole Year, however it sufficiently requites the Planter for his Pains and Trouble. An Acre of good Hop-ground well managed yields more Profit than many Acres of any other kind of Husbandry, or Plantation in this County, Fruit excepted. If an Acre produces ten hundred weight of Hops, *communibus Annis*, and these are sold for three Pounds *per* hundred; and that the Charge of an Acre of Hop-ground is fifteen Pounds *per Annum*, viz. allowing 3 *l.* for the Husbandry, 4 *l.* for the wear of Poles, 5 *l.* for picking and drying, 1 *l.* 10 *s.* for Dung, 1 *l.* for Rent, and 10 *s.* for Tythe: the clear Profit of an Acre is 15 *l.* *per Annum*.

Two things are indeed a Discouragement to the Planter: That Hops are a very uncertain Crop, being subject to so many Casualties and Accidents from Winds, Blights and Insects; and when a Crop wholly fails, 'tis an intolerable Loss. And that if there happens a general Crop, when the Plantation is of late Years so

very much increas'd and over-grown, it will not answer the Charge.

To the first it may be said, that a Year of Scarcity sometimes is for the Planters Advantage, because it consumes the whole Stock of Hops, empties the Country, and makes room for a good price the Year following. And to the second, that those who can forbear the Money, and lay up their Hops in a plentiful Year, in a blasting Year, which frequently happens, will be well paid for their Forbearance.

There is one great Advantage made by Hop-ground in this County, which ought to be mentioned. There is no Ground so proper to raise an Orchard of Fruit Trees; its being constantly till'd and mended, causes the Trees to grow and thrive exceedingly. Some plant their Hop-ground with Apples, some with Cherries, and others with Apples and Cherries mixt together, which is to be preferr'd; for after about ten Years, when the Cherry-trees begin to bear considerably, the Hops may be destroyed, and re-planted in a fresh Ground, if you see good; and after about thirty Years, when the Cherry-trees are decayed, the Apple-trees will be in perfection.

Chap. XXI. *Of French Furze.*

THEY make very great Improvement of their sandy, gravelly Land in *Devonshire* and *Cornwal*, where Fuel is very scarce, by sowing of them with French Furze Seed, which they reckon a great Improver of their Land, and a Fitter of it for Corn. Upon some Lands they

they will grow to be fourteen or fifteen Foot high, and afford very great quantities of Fuel. But I must refer a more particular Account of this to further Intelligence.

Sir *Hugh Plat* commends *Ferne* very much to mend Hop-gardens with.

Chap. XXII. Of Carrots.

Carrots, though Garden-roots, yet they do well in the Fields for Seed, though the Land for them should rather be digged than plowed; but if it is plowed, it should be very deep, because they thrust their Root much downward. They delight in a deep, rich, warm, black Garden-mould, rather inclining to Sand than Clay. They make great Improvement of their sandy Land this way in *Northamptonshire*, as Mr. *Moor* affirms.

The time of sowing them is about the beginning or middle of *March*. They should be well covered and hoed, till they get above the Weeds. The Roots are good for Hogs and Geese; but the best Profit of them is the Seed, which near great Cities sells for a great Price. At *London* it commonly yields from five Pounds to ten or twelve Pounds *per* hundred.

I heard of a Man in *Essex* that had an old Orchard of about an Acre of Ground that was a very rich Mould; he stubbed up all the Trees, and dug it up, and sowed it with Carrots, which he let run to Seed, and had of it ten hundred weight, which he sold that Year for ten Pound *per* hundred.

Chap.

Chap. XXIII. *Of Teasils.*

IN some Parts of *Essex* they sow their Lands with Teasils to dress their Bays and Cloth with; which they do upon Lands already plowed up for Corn: And about *December* they either double furrow it, that is, have one Plough to follow the other in the same Furrow, or dig it up; and the latter end of *February* or the beginning of *March* they sow the Teasil-feed, which they keep well weeded in Spring. One Peck will sow an Acre. They esteem a Clay-ground the best Soil for them. They cut them about *August*, tying them up in Bundles or Staves, as they call it, and set them to dry in the Sun if the Weather be fair; but if not, they set them in Rooms and dry them there. The common Produce is about an hundred and sixty Bundles or Staves upon an Acre, which they sell for about one Shilling a Stave. But the most common way of propagating them is to sow them mixed with Caraway and Coriander-feed, of which there is a great deal sown about *Kelvedon*, *Coggeshal*, and other places in *Essex*.

Chap. XXIV. *Of Caraway and Coriander-Seed.*

Caraway Seed delights in a dry Mould something inclining to Clay, or rich Garden-Mould, which they sow about the latter end of *February*, or beginning of *March*. Eight Pounds will sow an Acre, with which they

they commonly mix eight Pounds of Coriander-feed, and sometimes about half a Peck of Teasils, both which yield their Crop the first Year; whereas the Caraway Seed is the second Year before 'tis fit to cut, but then it will last three or four Years, for which they order the Ground as for Teasils, and keep the Land hoed twice a Year, once in Spring, and in *August*, which costs them ten or twelve Shillings an Acre to do.

Chap. XXV. *Of Anniseed.*

A Nise may be propagated in *England*, if sown in *February*, for which the Ground should be prepared about *Michaelmas*, and some new Horse-dung strewed upon it to preserve it from the Frost. The Seed will be ripe about *Bartholomew-tide*, when they may be sown again for next Year. It is best to renew the Seed every two Years. The Leaves hereof are used in Sallet, and have a very pleasant Taste; but they must not be too much nor too frequently used with hot Food, but with Fish they may securely; and the bad Qualities thereof may be allay'd by mixing Parsley, Bete and Borrage or Lettice therewith. They also may be sown for good Profit for Merchandice.

B O O K VI.

Chap. I. *Of several sorts of Beasts, Fowls, and Insects, for the Stocking of Land.*

AS the Farm is of little use unless it be stock'd with Beasts, or other Animals, that may be employed in the Labour and Work of it, and for the Supply of the Market and Kitchen: So the Farmer is to consider what will turn to the best Advantage, and what is most proper and suitable to his Land, for the Uses he intends to employ it for, and the Cost and Charges of such a Stock; that so he may suit his Undertaking to his Purse. The common reckoning for stocking of a Farm is three Years Rent; as, that three hundred Pounds will stock a Farm of one hundred Pounds *per Annum*, which is commonly near about what is sufficient, except in very dear Years. Concerning which sort of useful Stock I shall begin with the Horse, as one of the most noble, strongest, swiftest and most necessary of all the Beasts used in a Farm.

Chap. II. *Of Horses and Mares.*

WHere you have good store of Pasture, either in several or common, or in Woods or Groves, it's no small Advantage to keep a Team of Mares for Breed: But where there is most Arable, and little Pasture-Land,

Stone-

Stone-Horses or Geldings are more necessary, as may be observed in several Counties of that sort. In *Hertfordshire* they make great Advantage by buying of Colts out of *Leicestershire* of between two and three Years old, which at about six Years old they sell to Gentlemen at *London* for their Coaches. These Colts improve much in their Stature, and their Work pays for their keeping; which makes it a double Advantage to them, and gives the Farmer opportunity of bringing them up to be fit for business.

If you design to have beautiful strong Colts, let your Stallion and Mare be so, especially your Mares; for the Form and Shape of the Foal is most commonly more like to the Mare than the Horse, and more particularly for the Head and Neck, which is the beautiful part of the Horse, as has been long since observed by *Virgil*, who says,

*The Generous Youth, who studious of the Prize,
The Race of Running Coursers multiplies,
Or to the Plough the sturdy Bullock breeds,
May know that from the Dam the worth of each
proceeds.*

Let both the Stallion and Mare be of lively brisk Natures; for heavy dull Breeders will always produce lumpish heavy Colts: And see that they be of healthy sound Constitutions; for your Colts will for the most part have the same Distempers with the Stallions and Mares: And if you desire to have large Colts, be sure to have large-bellied Mares, that the Colts may have Room to grow in, and give them good keeping, and then you need not
fear

fear their Size, let the Stallion be of what Stature he will.

Make your Mares as tame as you can: It's better to keep them to gentle, easie Work, such as plowing an hour or two in a Day, &c. than to have them wild; for by being acquainted with their Keeper, and being soberly handled, you may with ease remove them from one Pasture to another, bring them to be covered, and to take their Colts from them: Whereas wild Mares are not only troublesome, but often destroy their Colts in their Bellies, by their wild leaping of Ditches and Hedges, &c. And the same Care ought to be taken with Colts to make them tame, who are often apt else to do themselves a Mischief, whenever you have occasion to do any thing with them.

The surest way of having your Mares breed, and the most profitable for the Farmer, except he keeps his Stallion to let out to hire, is to have a place well fenced, that is good Land to keep your Horse in, and to let your Mares go with your Horse during the Months of *April* and *May*: But your Horse this way will not serve so many Mares as if housed, nor be so fit for constant working the other ten Months of the Year: And therefore if you work him hard, or let him out to horse more Mares than your own, you must take him into the Stable, and feed him well; and if the Horse is kept in the Stable, it is reckoned best to take the Mare in too for about a Month or six Weeks, and that she be fed well with Hay and Oats, and that about five or six days before you bring her to the Horse, you let her blood on both sides of the Neck, taking about a Quart of Blood out of each Vein.

As

As to the manner of covering of the Mares, they have in the breeding Countries, in the house where they keep Stallions on purpose to let out to horse Mares, a square hole with a door to it, big enough for the Horse to put his Head and Neck out at; to which hole they bring the Mare for the Horse to smell on, by which means they can see whether the Mare will stand to the Horse or not, without any danger of the Mare's striking the Horse, or his doing of himself any Injury. If they find the Mare willing to stand, they have her out into some broad place, where they lead the Stallion out to her; and if he be unlucky and mad, with two men to lead him, and let him horse her: They reckon in the Morning fasting, or in the Evening, the best times of the Day; especially the Morning, and that the Horse be well provender'd, and drink but little over Night. When the Stallion is dismounted, they commonly throw a Pail of cold Water on the Mare, which they think makes her stand the better to her horsing.

After she is covered, they that are very exact in taking care of them, keep them to the same Diet as before for three Weeks or a Month, and without work, and about *September* they take their Mares into the house again, where they keep them till they foal; at which time they feed them with Mash and other moist Food till the Grass comes to be plenty: Which are Niceties the Farmer seldom troubles himself about. If after they have foaled they keep them a Night or two in the Stable, and give them the best Hay, Grass and Oats that they have, they think it sufficient.

The

The best Age to breed at, is when the Mares are from four to twelve Years old, and much longer, if the Mares have only been kept to breed on, and not wrought; and the Horse from five to fourteen Years old. I shall not mention any thing of the time of the Moon, nor about the several ways mentioned for the procuring of Horse or Mare Foals; because I could never find them effectual, or any ways significant.

Let your breeding Mares fourteen or fifteen days before their Foaling be well kept, which will not only make her have plenty of Milk, but cause her quickly to take horse again: The best time for which is about twenty days after her Foaling.

The best times for the weaning of Colts is at *Candlemas* or *Shrovetide*: In this respect you must be very careful; for if your Colts be not well weaned, well summered and wintered, especially for the first three Years, they will seldom prove either good or large: Be sure, for the first Summer, to keep them out of the hearing of the Dam.

When the Colts are about two Years old, it is the best time to take them up, and to make them tame; and the Year following, when they are three Years old, back them that are to be for the Saddle, only they must be used kindly at that Age. The first Year Saddle-Colts should only be walked, and the second but seldom trotted, and that but for a little way: But we cannot in *England* get upon a young Horse's Back without spoiling of him: And for those Horses that are for Draughts, I never knew any good Drawers, and gentle, that were broke after that Age; nor can I think
but

but that easie, gentle Work is good for young Horses, to use them to it by degrees: But I would not have a Draught-Horse, that I were desirous of being very curious about, wrought above one hour, nor a Saddle-Horse galloped, nor rid above ten Miles in a Day, till they are seven Years old.

If your Colts be any ways unruly or wild, at the first coming into the House, let them have no Meat but what they take out of their Keeper's hand; by which means you will make them gentle without any Violence: if that will not do, keep them waking and want of Sleep will cure the wildest Horse that is. But to prevent his being so, use him from his Foaling to be fed in Winter at hand in the House; and for some time when you back him first, never ride him but with a Horse before him, and always in the Company of as many Horses as you can.

Whoever will keep his Horse bridled and saddled some time after his riding of a Journey, and let him champ on the Bit 'till he is in good temper, and takes not off his Saddle 'till he is cold, and then rubs the Saddle-place well, and doth not give him Water when hot, nor ride him hard at first setting out when he is full, and that takes care to ride him softly for the last Mile or two before he comes to his Journeys end, will be sure not to have either a sick or lame Horse.

In *Flanders* they water their Cattle, that they keep in the House, three or four times a day, which they say is much better than doing of it but twice, because Cattle drinking so seldom, makes them drink too much at a time, so as to over chill their Stomach and Guts, in Winter, and fill their Bellies too full in Summer.

But the most occasion that Farmers have being for Draught Horses, I shall recommend to them the Choice of such as are strong, well limbed, and as near as can be, such as are of a height; for Horses in a Draught unequally sited, never draw at ease: And if they are well wrought, let them be well kept, and then you may expect business from them. A good Team of Horses cannot well have a less Allowance than forty Quarters of Oats in a Year, besides good Hay and good Grass when they are out of the House. It will likewise be necessary that the Farmer suit his Horses to his Ground as well as his other Cattle; so that where his Land is rich he have the larger, and where barren the smaller Sort of Horses, except he keep Stone-Horses, and keep them always at Hay and Oats.

Fifty Acres of Fallow-Land, is as much work as can well be managed by a Team of five Horses; if it is stiff Land, they must be very stout Horses, or that Quantity will be too much for them.

There are several Epidemical Distempers destructive to the Farmer's Stock: And though there are many Pretenders to the Art of Farriering and Cow-leeching, yet many of them are very ignorant, especially in the Countries, the Books that are writ upon that Subject being chiefly Collections from others, with a very small Number of experienced Receipts amongst them, so that but few can tell, out of so great a Number, which to chuse, unless they had opportunities of trying all of them, which would be a very expensive way of Knowledge to the Farmer. I have thought it might be of use to publish some Receipts that I have had the Experience of my self, or have from them that have experienced them, which I think I

can

can depend upon, because they have not been such as have had any Advantage by it : Which, though they are but a small Number, yet if by the communicating of them I can, for the publick Good, perswade others that have any experienced Receipts to communicate them to the Publisher hereof, that they may be here inserted, it will, I think, be a Work that will be of great Advantage not only to the Farmer, but even to the Professors and Practisers of these Arts too : And therefore I shall begin with some Observations concerning the Purging of Horses ; in doing of which, I shall consider two things : First, the Doses, which are to be proportioned according to the Size and Strength of the Horse ; and secondly give some Directions for the ordering of a Horse, when he takes a Purge.

§. 1. *Of Purging a Horse.*

Take Horse-Aloes beaten to fine Powder, one Ounce, two Ounces of fresh Butter ; and add a small Quantity of Powder of Anniseeds, for a Horse of thirteen Hands high.

Take Aloes one Ounce and a quarter, if a great feeding Horse ; if not, one Ounce and half a quarter, with three Ounces of Butter, and two Ounces of Anniseeds, for a Horse of fourteen Hands high.

Take Aloes one Ounce and a half if a great Feeder ; if not an Ounce and a quarter, and half a quarter, and something better : Then two Ounces of Powder of Anniseeds, with the same Quantity of Butter, for a Horse of fifteen Hands high.

Make these several Quantities into Balls of about the Bigness of a small Wath-ball ; and

after you have given two of them, give the Horse a Horn-full of strong or small Beer, and another Horn-full after you have given the rest of the Balls, which should be anointed with a little Butter.

The day before you purge your Horse give him warm Water with Bran in it, and the next Morning fasting give him the Purge: Ride him a quarter of an Hour, bring him in, and let him stand two Hours without eating; then give him some Hay, and an Hour after, water him with warm Water; and an Hour after that give him scalded Bran: Do the same at Night, and next Morning: If he purges ride him out a little; and then bring him in, and give him scalded Bran: a while after water, and ride him out again while he purges; then bring him in, and give him scalded Bran; a while after water, and ride him out again while he purges; then bring him in, and give him scalded Bran. Thus you may make it work more or less as you please, by repeating the giving of him Water and Riding. Over-night give him very little Hay; for it is best taking any Physick on an empty Stomach.

Note, that if your Horse is newly taken up from Grass, great care must be taken of him, and he must stand in the House at least a Week or ten Days before you purge him; and be sure give such a Horse scalded Bran, as is before directed. I have known several Horses killed for want of observing this Rule.

§. 2. *Another Purge.*

Take Aloes Succotrine an Ounce, Treacle an Ounce, Venice Turpentine an Ounce, Sena beaten an Ounce, Honey half a Pound: Mingle these

these together in a Pint of White-wine or Sack, and give it lukewarm for a Horse of fourteen Hands.

§. 3. *Another Purge.*

Take Aloes an Ounce, Jalap, Cream of Tartar, and Sena, of each a Drachm and a half, if the Horse be fourteen Hands, (it fifteen Hands, add half a Drachm more of each) of Anniseeds half an Ounce : Make it up with a little Butter into Balls as big as a Wallnut.

§. 4. *To Purge Grease, for a middle-sized Horse.* [†]

Take fresh Butter four Ounces, Castile Soap two Ounces, Hempseed in Powder two Spoonfuls, Sugar-candy an Ounce : Make it into Balls and give it, riding him after it, and let him have his Water warm'd the first time you water him.

§. 5. *If a Purge work too much, how to stop it.*

Take Bole-Armoniack two Ounces, a bit of Whiting as big as a Pullet's Egg ; beat it fine, and boil it in three Pints of Beer, with two or three Slices of brown Bread in it, and sweeten it with Sugar.

The best time to bleed, if you design purging of a Horse, is about ten Days after his Purging.

§. 6. *For a foundred Horse.*

Take an Egg, break it, and put it into a Horse's Foot, and keep it in by Putting a Piece of Leather over it, which you may fasten with

Splints put cross under the Shooe : Let him stand so all Night, or twenty four Hours, and it will for a Day or two, as I am told from very good Hands, make him go easie, and take away the Pain.

For *Surbating*, which is the beating of the Horses Hoof against the Ground ; use the same Medicine as above, or some fresh Butter.

§. 7. *For Coughs or Colds.*

Take a Quart of Ale, half an Ounce of Diapente, half an Ounce of Bay-berries bruised small, Grains of Paradise pounded an Ounce, Horse-spice two Ounces ; let it boil, and no more, adding to it two Spoonfuls of Sallet oil, and two of Honey.

When you give any of these opening Drinks, give it to the Horse in the Morning fasting, and ride him half an Hour after it, and tie him up three Hours to the Rack ; after which give him a Malt and warm Water at Night, and next Day in the Morning. If he goes to Grass, take him up a Night or two before-hand, and let him stand in two Nights after the taking of it : and when you turn him out, let it be in a warm Day, taking of him up two or three Nights more.

§. 8. *For an Old Cold.*

Take a handful of Mallows, four Ounces of blue Currants, half an Ounce of Manna, one Ounce of Alum, boil them in two Quarts of strong Beer, till it comes to one Quart : strain it, and put to it, four Ounces of Honey giving of it to the Horse next Morning warm.

§. 9. *To*

§. 9. *To Heal the Lungs.*

Take one Ounce of Anniseeds, one Ounce of Turmerick, one Ounce of Liquorish, one Ounce of Elecampane, half an Ounce of Diapente, and one pennyworth of Sweet Oyl, and as much Treacle, mix it with a Quart of new Wort.

§. 10. *A comfortable Drink.*

Take one Dram of Cochinell, twopenny worth of Mithridate, as much Venice-Treacle, and give it in half a pint of Sack mixed.

§. 11. *To cool the Liver.*

Take one pint of Milk a penny-worth of Honey, and as much Sweet Oyl.

§. 12. *For the rising of the Lights.*

Take Four Ounces of Turmerick in a Quart of Small beer.

§. 13. *For the Mange.*

Take Flower of Brimstone, a little Oyl of Turpentine, a little sweet Oyl, and rub it well in.

§. 14. *For a sore Heel.*

Take two Quarts of Chamberlye, one Quart of Ox Gall, one Ounce of Roman Vitriol, a quarter of a pound of green Coperas, and boil
P 4 all

all together; but if 'tis for a farcy Horse, take Vinegar instead of Chamberlye.

§. 15. *To dry a Sore Heel.*

Take half a Pound of Roach Alum, as much green Copperas, one Ounce of white Copperas, and boil all together a little, in three Pints of running Water.

§. 16. *For an ordinary Cold.*

Take a small Piece of Rag dipt in Tar mix'd with a little Honey, and tye it about his Bit; ride him upon it, and set him up warm.

§. 17. *For a Grass-Cold.*

Take up your Horse early in the Morning, give him a Pint of Ale lukewarm; dissolve in it half an Ounce of the Juice of Liquorice, ride him half an Hour softly, so as not to heat him at all, and turn him out presently.

§. 18. *Balls for a Cold, Consumption, or any inward Distemper.*

Take Wheat-meal six Pounds, Aniseeds two Ounces, Cummin-seeds six Drachms, Carthamus one Drachm and a half, Fenugreek-seeds one Ounce and two Drachms, Brimstone one Ounce and a half, Liquorice six Ounces, Elecampane three Ounces, Bay-berries and Juniper-berries of each an Ounce and a half, Sallet-oil one Pint, Honey one Pint and half, the Yolks of six Eggs, White-wine four Pints. All being finely powder'd, make them into Paste, of which

which make Balls as Big as a Man's Fist, and give the Horse a Ball dissolved in his Water, Morning and Evening, for fifteen Days together, If he refuse it at first, he will quickly desire it if kept to it.

§. 19. *Of the Plague, Gargle, or Murrain in a Horse.*

The Murrain is principally caused from a hot, dry Season of the Year, or rather from some general Putrefaction of the Air, or from the Infection of other Cattle, from Cattle smelling to Carrion, and licking of the Bones; from foul Food, as overflown Hay, Grass rotted by the long standing of Water on it in wet Summers; which Sort of Food is much better to rot on the Ground than to be made use of. All these things beget an inflammation in the Blood, and cause a swelling in the Throat, which in little time suffocateth the Cattle.

The Signs of this Disease are a hanging down of the Head, Gum at the Eyes as big as your Finger, going weakly, staggering, the Head swelling very big, the Breath short, the Heart beating with ratling in the Throat: And if you put your Hand into his Mouth, and find his Breath very hot, his Tongue shining, he hath the Distemper very strong. If he be taken backward, he will be very stiff, and his Guts rumble very much.

If any of your Cattle are infected, speedily let both sick and well Blood, and drench them. The following Receipt I have not had opportunity to try, but it hath been much recommended to me.

Take Diapente a Quarter of an Ounce, Dialthea, London Treacle, Mithridate, and Rhubarb,

barb, of each the Quantity of a Nut; of Saffron a small Quantity, Wormwood, red Sage, of each an handful, and two Cloves of Garlick: Boil all together in two Pints of Beer, 'till it comes to a Pint and a half; give it lukewarm, when he is fasting: Keep him very warm, and give him a Mash of Ground-Malt; let him drink warm Water for a Week, and sometimes have boiled Oats. If you can make him sweat he will do well: If one Drink will not do, give him another three Days after. Half the Proportion will do for a Cow.

§. 20. *For the Cholick, Belly-ach, or Gripes.*

This proceeds from a fretting, gnawing or swelling of the Belly, occasioned from windy Humours, or from eating of green Corn, or Pulse.

It is known by a Horse's stretching his Neck, Legs, or Belly, by his lying down and rising often, stamping with his Feet: He will rather look full than empty: And if he is cold in the Mouth, he is in great danger.

Take half a Pint of White-wine, warm it, and put to it six Ounces of Oil, and fifty Drops of Spirit of Harts-horn; give it the Horse: But if he is full of Blood, let him bleed first. If the said Dose will not do, give him another; into which you may put a hundred Drops of the Spirit of Harts-horn.

Take Aqua vitæ four Ounces, two Nutmegs grated, Saffron two Drachms, Sallet-oil six Spoonfuls; give it the Horse, ride him after it, and set him up warm.

§. 21. *For Grease and swollen Heels.*

If your Horse's Legs swell in the Stable, give him some Powder of Brimstone in his Oats, and it will make his Coat lie fine, and do him good for his Heels: But if his Legs swell much, use the following Receipt.

Take Soap and Hog's Lard, of each a like Quantity; boil it, and put some Turpentine into it a little before it comes off the Fire: Cut away the Hair, and spread a Plaister on Flax, apply it twice a Day, 'till it runs very much, and give him the Purge at Page 213, where you will find this Mark [+]. You may likewise rowel him in the Chelt.

§. 22. *For the Staggers or Stavers.*

The Staggers is a Giddiness in a Horse's Brain which turns to Madness. It is caused sometimes by corrupt Blood or gross tough Humours oppressing the Brain: And sometimes by turning of a Horse out to grass before he is cold, and by hard Labour. The Signs of it are Dimness of Sight, Reeling, and Staggering of the Horse, who for very pain will beat his Head against the Wall, and thrust it into his Litter, forsake his Meat, and have waterish Eyes.

First let him Blood in his hinder Parts to draw the Blood from his Head; and about the middle of his Forehead cut a slit thro' the Skin about half an Inch long; upon this clap a Plaister of Pitch: If it run, the Horse will do well again: if not, he will die. Before you lay on the Plaister, take a bit of the middle-part of a Dock-root, and thrust into the hole of
the

the slit, between the Skin and the Bone, up the upper-part of the slit, and lay the Plaister on it, which renew as you see occasion.

§. 23. *To cleanse the Blood.*

Take two Ounces of Antimony, as much Flower of Brimstone, and give it to the Horse in hot Bran.

§. 24. *To carry off any Grease or foulness in the Body.*

Take half a Pint of Sack, two penny worth of Mithridate, one dram of Saffron, one penny worth of sweet Oyl, and one Ounce of Elecampane powder'd.

§ 25. *For Cracks or sore Heels.*

Take a quarter of a pound of Hogs Lard, as much Turpentine, half an Ounce of Verdigrase, a quarter of an Ounce of Bees-wax, and boil all up together.

§. 26. *For the Gripes.*

Take four penny worth of Syrup of Marshmallows, an Ounce of Oyl of Turpentine, four spoonfuls of sweet Oyl; and give it to the Horse in a pint of white Wine cold.

§. 27. *For a Horses Heels, that swell in the Stable.*

In Summer time ride him into a Pond, that has a great many Leeches in it, and let them fasten to his Legs, and kill themselves.

§. 28.

§. 28. *For a Strain or Bruise.*

Take an Ounce of Camphire, and put it into half a pint of Spirit of Wine.

§. 29. *For the Glanders.*

Take a pint of Childrens Chamberlye, two Ounces of Oyl of Turpentine half a pint of white Wine Vinegar, four Ounces of flower of Brimstone, half a handful of Rue; boil it till it comes to a pint, and give it to the Horſe fasting, and let him fast after it six hours from Meat, and twelve from Water.

§. 30. *For the Farcy.*

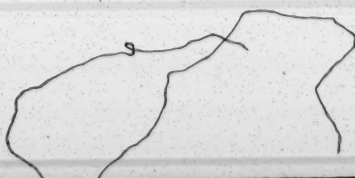
Take three pints of ſtale Beer, one handful of Rue, one handful of Featherfew, ſeven handfuls of Houſe-leek, four Ounces of Alum, two Ounces of Antimony; ſtamp the Herbs, boil all together till it come to a quart: Let the Horſe faſt three hours before you give it him, and afterwards ſix hours from Meat, and twelve from Water.

§. 31. *For a Mallendar.*

Take Bay-ſalt, Gun-powder and Hog's Lard, mix it together, and anoint the place once in two or three Days; you may add a Penny-worth of *Unguentum Apoſtolorum* to it.

§. 32. *Fore Sore Eyes.*

Where a Skin is growing over the Eyes, take an Egg, break off the top, take out the Yolk,
and



and to the White add a little fine powdered Salt, and set the Egg on the Fire, 'till it come to a Powder, which mix with a little Honey, and put into the Horse's Eye with a Feather: But if you find it not sharp enough to eat off the Skin; then blow the Powder alone in with a Quill.

Hobgoblin's Claws scraped to Powder, and put into a Quill, and blown into a Man's, Horse's, or Beast's Eye, is an extraordinary thing. You may have it at most Apothecaries in *London*.

If a great Rheum follow the Eye, lay round it the defenfative Plaister, which may be had at any Apothecaries. It's good to drive Humours from any Wound.

§. 33. *For a blow on the Eye.*

Take some Honey, and add a small Quantity of Powder of Ginger unto it, and put it into the Horse's Eye, or take some Hog's Lard, Oil of Roses, Oil of Elder, of each a like Quantity, melt it together, and anoint the Horse's Eye with it.

§. 34. *To draw out a Thorn.*

Take two Whites of Eggs, add to them some Wheat-flower and Vinegar, and tie it on with a Cloth.

§. 19. *To prevent a Mare's sinking her Foal.*

Be sure to take care of her in snowy Weather, and keep her where she may have good Spring-Water to drink, and not drink the melted Snow; which is very prejudicial to her.

§. 36. *For Gravel, or a Nail run into a Horse's Foot.*

Search it so as to lay it open, and pour into it Tallow boiling hot.

Chap. III. Of Asses.

THE Ass, though a contemptible Creature, is very serviceable to many that are not able to buy or keep a Horse; especially where they live near Heaths or Commons, the barrenness of which will keep him, he being contented with any trash, as dry Leaves, Stalks, Thistles, Bryars, Chaff, and any sort of Straw is excellent Food for him; he needs very little looking to, and will sustain Labour, Hunger and Thirst beyond most Creatures, and is seldom or never sick; and of all other Cattle he endureth the longest. They may be made use of to plow light Lands, to carry Burdens, to draw in Mills, for which they are very excellent, to fetch Water, or any other odd things. They are very useful for their Milk, which is an excellent Restorative in Consumptions and other Weaknesses: But they would be of much more Advantage, were they used, as they are in Foreign Parts, for the breeding of Mules, as I shall shew in the next Chapter.

The She Ass, when you have any regard to their breed, should be cover'd between the Months of *March* and *June*. The best Age to breed on them, is from three Years old to ten, and you should let the young Ass suck two Years,

Years, and not work them 'till they are three Years old.

Those are reckoned the best shaped that are well squared, have large Eyes, wide Nostrils, long Necks, broad Breasts, high Shoulders, a great Back, short Tail, the Hair sleek, and of a blackish Colour; their Skins make the most durable Shooes of any sort of Leather whatever.

But I suppose the great Impediments of the keeping them are the Injuries that they do to Trees, which they are very mischievous to; and their slowness; but that hath a Convenience in it, in that it is what makes them able to endure so great Labour and Hardship.

Chap. IV. *Of Mules.*

Mules are chiefly used in the Rocky Countries, where are stony and rocky Ways, as on the *Alps*, the *Pyrenean Mountains*, &c. where great Numbers of them are kept; so as that upon the Roads you may see forty or fifty of them together, most of them coal-black, that are very finely shap'd, and very large, being bred of the fine *Spanish* Mares, which are some of the handsomest sorts of Mares that are; and the Mules are as fine, many of them being sixteen or seventeen Hands high, and valued at forty or fifty Pounds a-piece: They are the best sort of Creatures that are for Burden and Sure-footedness, especially in stony ways; and are excellent for draught, and the greatness of their strength: An Instance of which I saw in one that my Father had which was bred in *England*, that was for shape a very thick short one, and for

for height about fourteen hands and an half: This Mule being put in the Fill of a Cart, at the bottom of which was flung a very great piece of Timber, so big, that because it was to be drawn up a steep Hill, the Carters and other Countrymen present, concluded that the Mule and four stout Horses more could not draw it up; and while they were busie about the tying of it, and doing some other things to the Cart, they not minding to hold the Mule, or to take any care of him, he alone run away with the Cart and Timber, half way up the steepest part of the Hill, before they could stop him: And I saw in *London* two Mules that were Sumpter-Mules to a Colonel in *Flanders*, bred there of the large *Flanders* Mares; one of them was sixteen Hands and an half high, and the other seventeen and an half, and they were as big set as any of the Dray or Cart-horses used in *London*: And several of the Soldiers did affirm that they had travelled for several Months together with eight hundred Weight a-piece on their Backs. Which makes me wonder that they are not more minded in *England*, than they are; especially considering their Hardiness, and freedom from Distempers, and the length of their Lives, which is almost double to that of Horses. In which particular those bred in the cold Countries far exceed them that are bred in the hot; they go easier, and are much better to ride than Horses for their Walk and Trot; but they are commonly rough Gallopers, though some of them are very fleet that are long made: Their Shape for Nimbleness, Strength and Bigness being much according to the proportion of the Mare you bred them on, and so they may be suited for what use

you design them. The greatest Inconvenience that attends them is, that many of them are apt to kick and be stomachful : But it is commonly the not taking due care of them while they are young : They being of little value amongst us, makes People neglect them; else those bred beyond Sea are as gentle as either Horses or Mares.

Mules are of two sorts; the one between the Horse and the She-Afs, and the other between the He-Afs and the Mare : The first sort are commonly very dull, and partake too much of the Afs, and are not so large : And therefore the latter sort are much more used and propagated. For this sort of Breed you must take care to get one of the largest and finest He-Asses you can procure. In *Spain* they are so curious in their Breed of Mules, as to give fifty or sixty Pounds for a well-shaped, large He-Afs only to make a Stallion of, and Breed of the finest, largest Mares they have, which they do by giving to the Afs the Advantage of the higher Ground, and by putting of the Mare into a narrow Pit railed on each side : And though the Mules are of both sorts, yet being a mixed kind, they never breed, though some Authors affirm, that there are a sort in *Syria* that procreate of their own kind.

If the Afs you design to breed on be suckled with a Mare, or the Mare suckled with an Afs, it makes them the more familiar, and the better acquainted with each kind; which you may bring either of them to do by taking of the Colt that belongs to the Dam away from her, and by putting of the other Colt to her in the dark for ten Days or a Fortnights time.

Chap. V. *Of the Bull, Cow, Calf and Ox.*

BULLS and Cows are very serviceable to the Husbandman for Work, and for the supply of the Family and Market. The best breed is reckon'd that of *Yorkshire, Derbyshire, Lancashire, Staffordshire, &c.* and a good hardy sort for fattening on barren or midling sort of Land are your *Angleseys* and *Welsh*. The hardiest are the *Scotch*; but the best sort of Cows for the Pail, only they are tender and need very good keeping, are the long-legg'd, short-horn'd Cow of the *Dutch*-breed, which is to be had in some Places of *Lincolnshire*, but most used in *Kent*; many of these Cows will give two Gallons of Milk at a Meal: But in furnishing of your self with Cattle, you ought to consider the Goodness of your Land, and the use you design your Cattle for, as whether for Breed, Milk or Work.

If for Breed, the better your Land is, the larger may your Kine be; and the cheaper, the more will be your Profit: Only observe, that of what kind soever your Breed is, that it be the best of the sort, and let your Bull be of the same Country with your Cow, for they reckon a mixed Breed not so good.

For the shape of your Bull, he should be one of a sharp quick Countenance, his Forehead broad and curled, his Eyes black and large, his Horns long, his Neck fleshy, his Belly long and large, his Hair smooth like Velvet, his Breast big, his Back strait and flat, his Buttocks square, his Thighs round, his Legs strait, and his Joints short; this sort of Bull is the

best for Breed, and makes the best Oxen for draught.

The Cow ought to have a broad Forehead, black Eyes, great clean Horns, her Neck long and thin, a large deep Belly, thick Thighs, round Legs, short Joints, a white large deep Udder, having four Teats, and her Feet large. As for the size of your Cows, as of all other Cattle, it must be suited to the Goodness of your Land, though the largest commonly give the most Milk : And whether you design them for Breed, Fattening or Milk ; let them be such as come off a worse Ground than your own as near as you can. The best time to breed Calves is from three Years old to twelve.

The Use of the Cow is either for the Dairy or Breed : The red Cow is reckoned to give the best Milk, and the black to bring the best Calves ; but the Cow that giveth Milk longest, is esteem'd the best, both for Profit and Breeding ; and for them to Calve in *March* or *April* is the best time for the Dairy.

I shall not mention any thing about the making of Butter and Cheese, because most good Housewives are acquainted with the way of doing it ; only as some Lands will make unsound Cheese, notwithstanding all the Care the good Housewife can take, I shall here propose a Remedy or two for that Inconveniency ; which is, if you find any of your Cheese begin to be rotten, to cut it out, and scrape some Chalk into the Hole, so as to fill it up ; and to keep the Chalk from dropping out, spread some Butter over it, and it will prevent its going farther, by drying up the Moisture that causes it to corrupt : And to prevent the Mites breeding in Cheese, rub it over where you see them
begin

begin to breed, with Oil or Oak-ashes once in three Months, and it will kill them.

When a Cow is near Calving, for about a Fortnight or three Weeks before, put her into good Grass; or if it be in Winter, give her Hay; and when she hath calved, that Day and Night keep her in the House, and let a little of the Cold be taken off the Water which you give her: Next day about the middle of the day turn her out if well, and well cleaned, and take her in two or three Nights more, giving her Water a little warm every Morning before you turn her out.

For Calves there are two ways of breeding those that you design to rear; the one is to let them run with the Dam all the Year, which is the common way used in the cheap-breeding Countries, which they reckon makes the best Cattle; and the other way is to take them from the Dams after they have sucked about a Fortnight: Then they teach them to drink flet Milk, which they do but just warm for them, it being very dangerous to give it them too hot. The best time for weaning of Calves is from *January* to *May*. Let your Calves have Milk for about twelve Weeks; only a Fortnight before you wean them from Milk, let Water be mixed with the Milk; and after your Calf hath drank Milk about a Month, take some of the finest sweetest Hay you have, and put little Wisps of it into some cleft Sticks, which place so as the Calf may easily come at them for to learn him to eat; and after *Lady-day*, when the Weather is fair, turn your Calves to Grass, taking them in a few Nights at first, giving them Milk and Water, and sometimes giving the same to them in a Pail in the Field,

till you find they are able to feed of themselves as not to desire it : But by no means let your Grass be too rank, but short and sweet, that they may get it with some Labour. All wean their Calves at Grass ; for if you wean them in the House with Hay and Water, it is apt to make them big-belly'd, and to rot ; and when you have resolv'd which to keep of the Males for Bulls, let the others be gelt for Oxen, which the sooner you do, the better : When they are about ten or twenty days old is the best time, and least dangerous.

In *Hertfordshire, Essex*, and most places near *London*, they commonly fat all their Calves for the Butcher, because they have there a good Market for them, and their Lands are not so profitable to breed on as in cheaper Countries ; a good Calf there often selling for as much as a good Heifer, especially if they are very Fat and White, which they take a great deal of Care to make them ; their way of doing of which is by keeping of them clean, giving of them fresh Litter every day, which they lay upon their old Litter ; for they clear out their Coops but two or three times in a Year, and most commonly at such a time as they have no Calves in them ; they constantly also let them have a large Chalk-stone or two to lick, which they bore a hole through, and hang up by a string in a Corner of the Coop, which prevents their fouling of it with their Dung and Urine. They also observe to set their Coops where they may have as little Sun come on them as they can, that they be not made close and stifling, and that they stand a Yard above the Ground, that the Urine may run from them : And to make them white, they
often

often let them blood, when they are about a Month old, and a little before they kill them; and because they are often loose, they let them not suck their fill, but instead of it they sometimes give them Chalk scraped into Milk, which they pour down with a Horn; also Salt and Water, and sometimes they cold bath them and give them Bole-Armoniack and Chalk, which they moisten with Milk, and make it into Balls, and give them; and if a Cow will not let a strange Calf suck her, rub her Nose and the Calves with a little Brandy.

Of Oxen the largest are esteemed the best for Draught, or for Feeding (where there is Land able to bear them) such being the strongest to endure Labour. For his Shape, it differeth little from that of the Bull; they that are the gentlest are the best for the Yoke. In matching of them, let them be as near as you can of one Height, Spirit and Strength, else one will be apt to injure the other; and you must take care not to put them beyond their ordinary pace, for heating of them puts them into Surfeits, and produces all manner of Distempers in them.

The time of putting of Oxen to work is at three Years old, at which Age, for the first Year, work them very gently, especially in hot Weather, and feed them with a good deal of Hay, which will make them better able to endure their Labour, than Grass will; the keeping of them in a middle State, neither too fat, nor too lean, is best; they commonly work them till they are about ten or eleven Years old, and then sell them; let them always be used gently; for Meat and fair Words brings them sooner to the Yoke than Fear or Blows: But the best way to rear up young ones,

besides gentle Usage, is to couple them with an old gentle Ox; if they are unruly, let them be tied with a Rope, and keep them hungry, that they may take Meat often out of your Hand.

Oxen are much more profitable to keep than Horses, there being no loss in them; if they prove either lame or old; an old worked Ox fattening as well, and being as good Meat as a young one, and then their Feed is much cheaper, because they eat no Oats; and so is their Harness and Shoes: They are likewise not so subject to Diseases as Horses; but you must have a good bite of Grass and good Hay for them in Winter; only they are not so good for Draught where your ways are good, and that you have occasion to cart much; but for Winter plowing, where you have a heavy Soil, they will do as much as Horses, especially a sort of a long-legged nimble Ox, that they sell at *St. Ives Fairs* in *Huntingtonshire*, which will of any Work do almost as much as a Horse: Where any can keep two Teams, let it be in what place it will, I should choose to have one of my Teams of Oxen. The yoking of Oxen together by the Necks and Breast, is much better than the doing of it by the Horns; and where a Man keeps an Ox-Team, it is necessary that he should rear two Oxen and two Cow-Calves every Year to uphold his Stock; for it is better for a Farmer as to all necessary things, that he be a Seller than a Buyer. Chalky Land furbates and spoils Oxens Feet more than any other Soil.

Cattle are bought in to fat at Spring, and about *Michaelmas*; those you buy in at Spring, will be fat in *July*, *August* or *September*, according

ding as they are forward, and you have keeping for them; and those that you buy in *August, September or October*, must be either to sell in Winter or in Spring, and must be forward in Flesh to be improved the beginning of Winter, and only kept up in Flesh during the hard time of Winter, either with Hay or Turneps, to be fit for a good Market whenever it offers; or they must be young lean Cattle, that may by their growth pay for their Wintering, and so be ready to fat next Summer. Some upon ordinary Land buy in young Welsh Heifers, which, if they prove with Calf, they sell in Spring with a Calf by their side for the Dairy; and those that are not with Calf, they fat: All which ways turn to good account, according as the Prices fall out; but most commonly all Meat either at *Christmas* or at Spring, is one third part dearer than in Summer: Because all have not the Conveniency either of Hay or Turneps to fat Cattle with in Winter; and it is but in few places, especially near *London*, (which is the chief Market for fat Cattle) that Hay can be afforded to fat them with; for they reckon an Ox that cost about six Pound, will need about two load of Hay to keep him up all Winter.

For the Wintering of Cattle, about *September* you must turn them out that you design to keep up for a Winter or a Spring-Market, and your Cows that give Milk into your Rowens, till Snow or a hard Frost comes, and they will need no Fodder; but if Snow or Frost comes, you must give Hay to your Cows near calving, or those that have lately calved, or that give a great deal of Milk, and to your fatting Cattle, and that every Morning and Evening,
which

which you must proportion according to the Quantity of Rowen or Tore that you have upon the Ground ; the more Tore you have, the less quantity of Hay will do, and even the sower Grass that your Cattle would not eat before, when the Frost hath taken it, will be good sweet Food for them, and what they will eat with pleasure, if it is not covered with Snow that they cannot come at it. But for your lean Cattle, and those that give but a little Milk, Straw will do well enough to fodder them with, only you must observe to give the Barley-straw first, and the Oat-straw last, except you value their Milk ; if you do, give to such Cows your Oat-straw, if the quantity of Milk that they give doth not deserve Hay, or that Hay is scarce with you ; for Barley-straw will quite dry up that Milk that they have, tho' it is good Food for dry Cattle ; but if your Hay fail you, to those Cows which you design to continue the Milk of, give Malt-dust, upon which pour scalding-hot Water, which will cause it to swell mightily ; let it stand till near cold, and give it to the Cow like a Mash, and it will cause her to give a great deal of Milk, though she eat Straw with it. A Bushel that costs but about Three-pence will serve a Cow a Week. But about *London* they give to their Cows in Winter Grains, (of which they have plenty) which makes them give a great deal of Milk, but it is apt to rot them if given in too great Quantities, and for too long a time : When your Tore is quite eaten up, which it will commonly be about *February*, you must house your Milch-Cows, that you give Hay to in your Cow-house all Night, and your other Cattle in your Yard ; for which use you should have

have
eat
eat
cies
you
give
they
both
made
Straw
which
will
As
or le
those
stru
Fo
Beast
and
Sheep
before
fowre
only
untou
Beast
taken
fures,
from
means
nity
being
As
tle, ta

have two Yards; one for your Cattle which eat Hay, and another for your Cattle which eat Straw, with Racks and other Conveniences to fodder them in; observing that what you give them, to do it often, and not to give them too much at a time; because when they have blown on it, they will not eat it; both your Yards ought to be well shelter'd, and made as dry as you can, and a good deal of Straw given them to lie dry and warm in, which is a very great Advantage to them, and will much increase the quantity of your Dung.

As to the buying of fat Cattle, Milch-Cows, or lean Cattle, Experience and the Advice of those that understand them, is the best Instructor.

For the feeding of Land you may do it with Beasts and Horses together, or with Beasts first, and Horses afterwards; and after both put in Sheep: But let not your Grass be too rank before you feed it; for if you do, it will be sowre, and your Cattle will not eat it, except only the Tops, and so the other part will lie untouch'd, and rot upon the Ground, for no Beast will eat sowre Grass till the Frost hath taken it. Observe also where you have Inclosures, to be often changing of your Cattle from one Pasture to another; for by that means you will give your Land an opportunity of getting of a fresh Head, fresh Grass being a mighty help to the Feeding of Cattle.

As to the Distempers of these sorts of Cattle, take these following Receipts.

§. 1. *For*

§. 1. *For the Garget, Plague or Murrain in Bulls, Cows or Oxen.*

Most Authors confound these Distempers together ; but whether they be the same, and only differ in the degrees of the Malignity, I cannot determine ; but commonly the same Remedies are proposed for both, tho' the Garget sometimes appears in the Head, and sometimes in the Maw, and sometimes in the hinder Parts. When it lies in the Head, it is known by the swelling of the Eye-lids, Blisters on the Tongue, &c. When in the Maw, by drooping and heaviness, panting of the Heart, hanging down of the Head, Costiveness of the Body, &c. And when behind he will be very stiff, and his Guts will rumble, &c.

If Blisters be on the Tongue, take them off with a sharp Knife, and slit the Tongue underneath an Inch long, but not deep, and an infectious Water will come out, which wash with Vinegar. If it lie in the Maw, or behind, let Blood in the Neck-Vein ; and for either of these Distempers give the following Drink, or that which is mentioned hereafter for the Murrain, which hath been recommended much to me by those that have often experienced them.

§. 2. *For the Gargle.*

Take Polypody of the Oak and Burdock-leaves, of each a handful ; for want of the Leaves take the same quantity of the Roots, shred them small, and put them into a Pint of Milk and boil them ; let it cool, strain it, and give it the Cow.

For

For the Head-Gargle, give Powder of Fenu-greek, Turmerick, Liquorice, Anniseeds, of each an Ounce; of long Pepper half an Ounce; beat all to Powder; boil it in a Quart of Ale, giving of it Blood-warm.

§. 3. *For the Murrain.*

For the Signs of it.

For the Cure.

Take unslacked Lime, Coriander-feed, Marjoram and Garlick, beat all to Powder, and sprinkle it on Coals, letting the Fume of it go up the Beasts Nostrils; it will bring away a great deal of the infectious Humour.

Take Plantain, Rue, Southernwood, Shepherds-purse, Smallage, Coleworts, of each a handful; bruise them, and with a handful of Hens-dung lay them in steep in a Pint of old Wash eight Hours; strain the Liquor, and add a Quart of Ale to it; put it on the Fire, consuming it to one half, and put into it an Ounce of Treacle, a Spoonful of Juice of Garlick, half an Ounce of Anniseeds, and the like quantity of Liquorice, and give it lukewarm.

§. 4. *For the Worm in the Tail.*

This is a Distemper that breeds in the End of Cattles Tails, like unto an eating Canker, which will cause them to grow lean, and so weak in their Back, that they cannot rise when down, and sometimes will make their Teeth loose. You may know it by the Hair being eaten off where the Worm lies, and you may by feeling with your Fingers find some of the Joints eaten asunder.

To

To cure it, take Soot, Rue stamped, Salt and Butter, and mix them well together, and apply it to the Tail, having first slit the inside of it about two or three Inches long, just above where the Joint fails, and rub her Teeth with Juice of Oranges, or Juice of Scurvy-grafs; you may likewise give her the following Drink for inward Distempers.

§. 5. *For any inward Disease in Cattle.*

If you cannot find out what the Disease is, take a Quart of Ale, Wormwood, Rue and Rosemary; of each an handful; bruise it in a Mortar, boil it, and strain it; adding to it two Spoonfuls of the Juice of Garlick, as much of the Juice of Housleek, and as much *London-Treacle*; mix all well together, and give it lukewarm.

To know if any Distemper is growing upon them, view the Top of their Noses in a Morning, and if Pearls like Drops of Dew hang upon them, they are in Health; but if they are hot, dry and scurfey, some Distemper is beginning to grow.

§. 6. *For any Imposthume, Boil or Swelling.*

Take Lily-roots, boil them till they are a pap in Milk, and apply it hot to the Sore. When the Sore comes to be soft, you may open it with a hot Iron, if you find need, and heal it with Tar, Turpentine and Oil mixed together, adding a little Hogs-lard to it when boiling-hot.

§. 7. *To*

§. 7. *To kill Worms.*

Chop Savin small, and mix it with sweet Butter roll it into Balls, and give it for two or three Days; after give them about a Pint of Sweet-Wort, in which dissolve a little black Soap, and it will bring them away; keep them warm after it, giving them warm Water, and without Meat three Hours.

§. 8. *Of Bleeding a Cow.*

Except it is an extraordinary Case, never take above a Pint of Blood from a Milch-Cow at a time.

§. 9. *For a Looseness or Bloody-Flux.*

Take some Sloes, boil them in a little Water, and add some powdered Chalk, and a little Quantity of Whiting to it, and put it when cold into the Water which the Cows drink.

Chap. VI. *Of Sheep.*

Sheep are not only a very useful Creature, but very profitable too, and will be kept and fatted upon much worse Land than any of the former Stock; and therefore they are by some preferr'd before any other Sort of Cattle. The best breed for fine Wooll is *Hereford* and *Worcestershire*; but they are a small black faced Sheep that bear but a little burthen. *Warwick*, *Leicester*, *Buckingham* and *Northamptonshire*, bear a large boned Sheep of the best Shape and deepest

deepest Staple : *Lincolnshire* in the salt Marshes breeds the largest Sheep, but not the best Wooll, tho' they are lately much amended in their Breed. *Torkshire*, and so Northwards, bears Sheep of big Bone, but their Wooll is rough and hairy. *Wales* bears a hardy small Sheep that hath the worst Wooll, tho' the best tasted Flesh. For Sheep, as well as other Cattle, buy them from a worse Land to bring on to a better, and see that they be big boned, and have a soft greasie well curled close Wooll, for such Sheep bear the best burthen, and are always most esteemed by the Butcher.

For the Choice of Sheep for breed, see that the Ram be young, and that his Skin be of the same colour with his Wooll; because the Lambs will be of the same colour with his Skin; that he be of a large long Body, his Fore-head broad, round, and well rising, his Eyes chearful and large, his Nostrils straight and short, &c. The polled Sheep (that is Sheep without Horns) are reckoned the best Breeders, because the Ewes yeare the polled Lamb with the least danger, and because so much less of the Nourishment goes into the Horns. An Ewe should have her Neck large and upright, bending like a Horses, her Back broad, Buttocks round, thick Tail, small Legs but short, clean and nimble; the Wooll thick and deep, covering her all over: And to know whether they are sound or not, see that none of the Wooll be wanting, that their Gums be red, Teeth white and even, the Brisket-skin red, the Eye-strings ruddy, the Felt loose, the Wooll fast, the Breath sweet, and the Feet not hot: For if they are rotten, the Eyes are pale and dark, the Gums white, the Wooll easie to come off, the Teeth
yellow

yellow and foul, and when dead you may see the Belly full of Water, the Liver putrefy'd, the Fat yellow, and the Flesh moist and waterish; as for their Age two Years old is the best Age to have Sheep at: And for them to take Ram at where they prove with Lamb before; you ought to sell the Lamb as soon as 'tis convenient, which is commonly about *October*; because suckling of the Lamb too long will weaken them too much. They will bear good Lambs till they are Seven Years old. In order to know which, when a Sheep is one Shear, as they call it, they will have two broad Teeth before; when two Shear, four; when three Shear, six; when four Shear, eight: And after that their Mouths will begin to break.

For Land to breed Sheep on, it is observed, that fat Pasture breeds straight, tall Sheep; and Hills and short Pastures breed square ones, Woods and Mountains small and slender Sheep; but the best for all Sheep are new plowed up Land, and all dry Grounds; and so on the Contrary, all wet, moist Lands are bad, especially such as are overflowed, and soiled with Sand and Dirt, except the salt Marshes, the Saltness of which makes amends for their Moisture, any thing of Salt by reason of its drying Quality, being of great Advantage to Sheep.

As for the time of putting the Rams to the Ewes, you must consider at what time of the Spring your Grass will be fit to maintain them and their Lambs, and whether you have Turneps to do it with 'till your Grass comes: For many times both Ewes and Lambs are killed for want of keeping; or the Lambs very often stunted in their Growth, which if once they get will be a very great hindrance to them,

and a long time before they will recover it: And therefore as an Ewe goes twenty Weeks with Lamb, you may easily calculate the time for her, to take Ram in: But the best time for them to yean is in *April*, except where you have very forward Grass, or Turneps, or that your Sheep are Field-sheep, where you have not Inclosures to keep them: Then it will be necessary to have them yean in *January* or *February*, that the Lambs may be strong before *May-day* to follow the Ewes over the Fallows and Water-furrows: But then Lambs that come so early must have a great deal of care taken of them, and so must all other Lambs at their first Falling: Else while they are weak, the Crows and Magpies will be apt to pick out their Eyes: If you save the Grass and Weeds that grow in the Lands that you design to fallow in Winter, that is from *Christmas*, and turn your Ewes and Lambs into them in *March*, if you have a mild Winter, it will be a great help to them.

If you turn Sheep into Wheat or Rye to feed, let it not be too Rank before you put them into it, least it make them Scowre.

Your Ewes that are big, and other Cattle, should be kept but bare; because it is very dangerous for them to be fat at the time of bringing forth their Young, except only for about a Fortnight or three Weeks before they may be pretty well kept to get them a little into heart.

As to the weaning of Lambs in some places they never sever the Lambs from their Dams, especially in the best Pasture where the Ram goes constantly with the Ewes; because the Ewe when she goes to Ram again, will go dry, and wean the Lamb her self; and likewise in unsound

Pasture

Pasture
run
while
in fu
the B
stures
Week
them
mong
wean
been f
serve
Abc
Male
the bel
by the
already
they a
The
the Mi
good fo
before
washed
your V
after in
in doin
not to l
nor yet
and see
shear th
hind, b
Year:
ought t
which i
and beh
it, whi
and the

Pasture they reckon it the best for Lambs to run with the Ewes, because they seldom rot while they suck, except they want suck; and in such cases it is much better to sell them to the Butchers; but they that have found Pastures may wean them at sixteen or eighteen Weeks old, if they find it inconvenient to let them run longer, but if you suspect a Rot among your Sheep, Mr. Moor says, that if you wean your Lambs about *June* or earlier, it has been found one of the best Remedies, to preserve both Sheep and Lambs.

About *Michaelmas* you should separate the Male from the Female, and having chosen out the best, those which you design for Rams put by themselves, the rest geld that are not geld already: But the best time of doing it is while they are very young.

The best time of shearing of Sheep is about the Middle or latter End of *June*; because it is good for them to sweat a little in their Wooll before you cut it; and they must be very well washed, which is a great help to the Price of your Wooll. Let them go two or three Days after in clean dry Ground before they be shorn: in doing of which the Shearer must take care not to hurt them with the Point of the Shears, nor yet to cut their Skins, because of the Flies; and see that the Wooll be well wound up. Some shear their Lambs too, which they do close behind, but very little before, especially the first Year: But before they are shorn, great care ought to be taken to tag them, as they call it, which is to clip away the Wooll of their Tails, and behind, that the Dung may not hang on it, which else will occasion them to be sore, and the Flies to blow them, and fill them with

Maggots. Wool is commonly Sold by the Stone which is 14 l. or the Tod which is 28 l. or by the Sack, which is 26 Stone or 364 Pound.

In *Gloucestershire* they house their Sheep every Night, and litter them with clean Straw, which affords a great advantage to their Land by the Manure, and they say makes their Wooll very fine.

In *Middlesex* and round *London* they buy *Way-bill* Sheep, which are a Sort of Sheep bred in *Hampshire*, *Wiltshire*, &c. that lamb very early, commonly before *Christmas*; these Lambs they keep in little Penns in a House, and bring the Ewes two or three times a Day to them to suckle them, which quickly makes the Lambs fat even in the hardest Weather, especially if they have Turneps to give the Ewes; because the Lambs are sheltered, and do not ramble about in extremity of hard Weather. Where they have not Turneps, some give to their Ewes the finest Hay, and Bran, and Oats.

Some make a great Improvement of their Lands by folding of Sheep upon them, which Folds they make with Hurdles, so as to remove them from one place to another; and so when the Sheep have dunged one place, they new place the Folds, and dung another, by putting the Sheep into them every Night, which they only do in Summer-time, as near as they can in good Weather, because folding of them is apt to make them have the Rot; and care should be taken when they are let out in a Morning, not to do it before the Sun is risen, and then they should be drove to a good Feeding-place: for being hungry they will eat any thing that comes next; the not observing of which, many times is a great Prejudice to them, especially

cially
all Fo
partic
and t
flop
come
Urine
The
is the
a har
ry we
be in
being
Disten
cured
gone v
lands.
other S
vention
a Mon
which
the Ro
pers t
too mu
and th
that d
them o
them t
which
best a
these D

G^{Oa}
b

cially in moist ill Ground ; but many reckon all Folding of Sheep to be very bad for them, particularly if Storms or ill Weather happen, and therefore they rather chuse to stick Stakes sloping in the Ground, to which the Sheep will come and rub themselves, and so Dung and Urine on those Places where they stick them.

The great Inconveniency which attends Sheep, is their being subject to the Rot ; which it is a hard thing to prevent, if the Year prove very wet, especially in *May* and *June*, except it be in salt Marshes or in broomy Lands, Broom being one of the best Preservatives against that Distemper of any thing. I have known Sheep cured of the Rot, when they have not been far gone with it, only by being put into Broomlands. Scurvy-grass, Parsly, Mustard and all other Sorts of hot Herbs are good for the Prevention of it. Some propose to give Sheep once a Month, or oftner, half a Handful of Bay-salt, which may be of some Service to them : But as the Rot, Red-water, and most of the Distempers that Sheep are subject to, proceed from too much Moisture of the Land they feed on, and the Season of the Year ; so I should think that dry Food at such times and the keeping of them on dry Land in wet Seasons, and to give them fine Hay, Oats, Bran, &c. (amongst which some Salt might be mixed) might be the best and properest Food for them to prevent these Distempers.

Chap. VII. *Of Goats.*

GOats are of Advantage to be kept in rocky, barren Places, where other Cattle cannot
R 3 get

get a livelyhood: They will climb the highest craggy Rocks to feed upon Briars, Bushes, Heath, and other Wood: And tho' they will feed in plain Pastures, yet their chief delight is in browsing upon Trees; and therefore great care ought to be taken to keep them from all Sorts of valuable Plantations; the chief Profit of them is their Milk, which is esteemed the greatest Nourisher of all liquid things on which we feed (except Woman's Milk) and the most comfortable to the Stomach: Many mix it with other Milk in barren Countries, where they cannot keep many Cows to make Cheese with, for which use it doth very well: Their Kids also are very good Meat, which the best Sort of them commonly produce twice a Year, and two or three of them at a time; some Outlandish Sorts of them more. Some shear their Hair to make Ropes with, which will lie a long time in Water without rotting, and some make particular Sorts of Garments of it.

The Goat ought to have a large Body, well haired, great Legs, upright Joints, not bending, a Neck plain and short, Head small and slender, large Horns and bending, a big Eye, a long Beard: and the She should have large Teats, a big Udder, hanging down Ears, and no Horns, at least very small ones.

For the ordering of them they should be kept in Flocks or Herds, that are used and associated together, or each Party will be apt to straggle from the other. They should have good shelter both from the heat in Summer, and cold in Winter: For they can neither endure the Extremities of the one or the other, especially the Shees which are with Kid. The best time for the Male and Female to go together, is about

Decem-

Decem-
them
hot
they
cann
they
Lam
If
own
them
any
Exce
and
They
Horf
of g
ing i

S w
n
but a
other
woul
Tubs
Ec.
Pickl
Meat
to th
the
indee
Grou
more
well

December. If you house them in Winter, let them have no Litter to lie on, because it is too hot for them; but let the Floor be paved, that they may be kept sweet and cleanly: For they cannot endure ill Savours. As for the Kids they are to be ordered in all things as they order Lambs.

If Goats are suffered to go and chuse their own Food, they are such good Physicians to themselves that they are seldom troubled with any inward Distempers; only the unnatural Excess of their Lust makes them soon grow old, and so quickly become past Use and Profit. They are reckoned very good to lie amongst Horses; the Scent of them, as they say being of great Advantage to prevent the Horses falling into Distempers.

Chap. VIII. *Of Swine.*

S*wine* are very advantageous to the Country-man, not only for their great Increase, but also because they feed upon what would otherwise be of no Use or Advantage, but would be flung away; as Whey, Washing of Tubs, Grounds of Drink, Dish-Water, Grains, &c. And their Flesh being best salted or kept in Pickle may be eat in the Spring when other Meat is at the dearest, besides the helps it affords to the taking off Garden-Commodities, and the Variety of Dishes of the Offal. They are indeed very greedy and given much to root up Ground, and to break Fences; and therefore the more care must be taken of them to keep them well rung and well yoked.

The largest Swine, and the greatest Numbers for any particular Places are bred in *Leicestershire*, and some Parts of *Northamptonshire*, and in the clay Countries thereabouts, which, I suppose, proceeds from the great Quantities of Beans and Pease sowed in those Parts.

The wild Kind are not so large as these Sorts, but are much hardier and better Meat.

In the Choice of Swine chuse such to breed of as are of long large Bodies, deep sided and belied, that have a short Nose, thick Thighs, short Legs, high Claws, thick Neck, a short strong Groin, and a thick Chine well set with strong Bristles.

To have too many Sows in one Yard is not good, for their Increase is so great, that they will for want of Food, not only devour whatever comes in their way, but eat one another: For a Sow will bring forth Pigs three times in a Year, that is at the End of every sixteen Weeks: And I have heard of a Sow that hath had twenty Pigs at a Litter: It is common for them to have thirteen or fourteen; but the Sow can rear no more than she hath Teats to suckle them with; the rest must be flung away, or put to other Sows. Some esteem them the best Pigs to keep for Store that suck the foremost Teats; but for what reason I cannot tell. If the Sow miss the time of going to Boar that she might in course have done, give her to eat some Oats parched in a Pan in her Wash, or the small End of the Runnet-Bag, and it will cause her quickly to go to Boar. The Pigs which you rear, after you have chosen out the best for Boars and Sows the Males must be gelt, and the Sows spay'd; the spay'd Gelts, as they call them, they esteem the most profitable, because of the great

Quan-

Quantity of Fat that they have upon their inwards more than the Hogs. Young Shoots which are Swines of about three Quarters of a Year old are best for Pork, and those of a Year or a Year and a half old for Bacon. The best Age for a Sow to bring forth Pigs is from one Year to seven Years old; and the best Age for the Boar, is from two Years to five Years old, at which time 'tis best to Geld him, or sell him for Brawn, the best Pigs to rear are those which are Pigg'd in the Spring. The best way of taking care of Swine is to feed them so as to keep them in a good, midling Plight, 'till you design to fat them: For if you keep them too fat, it will endanger their Health; and too lean will make them too ravenous. 'Tis good to give them such swill as you have every Morning and Evening to make them come home to their Coats; the rest of the day, let them graze, and get such Food as they can; only when Corn is upon the Ground, you must be careful to keep them within bounds. Moist sedgy Grounds are good for 'em, the Roots of which they will eat; and all Sorts of Haws, Hips, Sloes, Crabs, Acorns, Mast, Chestnuts, &c. with which if you have plenty enough to fat them, their Flesh will eat much better, and sweeter, than if fatt'd in a Stye: Only some say their Fat will not be so solid, nor so profitable: And therefore they commonly shut them up for a Week or ten Days, and feed them with dry Pease or Corn, to make their Fat firm. But 'tis a Mistake. I have killed Hogs fatt'd with Acorns, whose Fat was as solid as any fatt'd with Pease. In the fatting of Hogs in Styes, they observe to give them Meat often, but little at a time, that it may be always fresh;
and

and likewise to give them as much Water as they will drink, and to keep them very clean, which will much help their Fattening, and mend the Taste of their Flesh. But where the Husbandman lives remote from Wood, or that the Year doth not hit for Acorns, or Mast, they commonly fat them altogether in Styes with Pease, if cheap; if dear, with the Meal of Barley, Rye, or Offal Corn, according as they are cheapest, which they mix with Water, Whey or Skim'd-milk, with which they feed them, 'till fat; which will commonly be in about a Month's time, and then they feed them with Pease, only a little before they kill them.

Observe, That every Stye have a Yard well paved with Stone, if you can, for the Hog to go out and ease himself in, that he may keep his Lodging the cleaner and air himself.

In *Leicestershire* they have a very easie way of fattening great Numbers of Swine, which they do, by stacking up their Pease and Beans, which they shape like to the Form of a small Cottage. This they set near some running Brook, and hedge a Yard in round about it, taking some Part of the Stream into the Yard for the Hogs to drink at, into which they turn such a Number of Hogs as they think their Pease or Beans will fat, where they let them live 'till their Provision is consumed, cutting the Reek down, and giving it to them as they can eat it. By this way they fat very great Numbers, which they dispose of at *London*, to the Navy for Sea.

Sycamore Leaves beaten down while Green, and given to Hogs well fat them very quickly.

Acorns, when given to Hogs, or other Cattle, some say should be cut in pieces, or broken,

ken,
in th
them
with
often

Gr
in th
Hole
all fi
Laye
and f
will l
bound

As
to, th
any t
their
Appe
are w
suspe
Bristl
the R
but i

Th
Head
stagg
from
eatin
rank
For

unde
the f

Ta
Mad

ken, because they are else apt to sprout or grow in their Bellies. Some propose to Macerate them in Water first, to extract their Malignity without which preparation, they are esteemed often prejudicial to Cattle.

Grains may be kept a great while if buried in the Ground, even in Summer time, but the Hole you put them into must be plaistered on all sides, or if you take Grains, and lay a Layer of them, and a Layer of Hops upon them, and so a Layer of Grains, &c. in a Tub they will keep a long time, and if given to a hide-bound or unthrifty Horse, they will recover him.

As to the Distempers that Hogs are subject to, they easily show their Illness, if they ail any thing, by the hanging down of their Ears, their dull heavy Looks, and the loss of their Appetite, whhich they never recover 'till they are well again. If you are to buy Hogs and suspect their Healthiness, draw a Handful of Bristles against the grain of the Hair; and if the Root be white and clean, the Hog is sound; but if they be bloody or spotted, he is sick.

§. 1. *For the Gargol in Hogs.*

The Signs of which are hanging down of the Head, and carrying it on one side, moist Eyes, staggering and loss of Appetite. 'Tis occasion'd from corruption of Blood, ingendred by the eating of rotten Fruit, Garbidge or Carrion, rank Grass, wherein is much Hemlock, &c. For the Cure of which, first let them Blood under the Tail, and under the Ears, and give the following Drink.

Take Angelica, Rue, Staverwort, or Hog's-Madder, and May-weed, of each a Handful;
shred

shred them very small, and boil them in a Pint of Milk very well; and when 'tis cold enough, add to it a Penny-worth of Sallet-oil, and the same quantity of Treacle. This Receipt I had from one that has often try'd it, and tells me he never found it to fail.

§. 2. *For the Meazels.*

The Sign of the *Meazels*, is, if you find under their Tongues small black Blisters, or that they cannot stand on their Hinder-legs, or that their Bristles when pulled out are bloody.

Give the Hog in his Wash an Ounce of crude Antimony powder'd, and keep him in the Styre three or four Hours after giving of it, and repeat it 'till cured. Some give them Brimstone in their Meat, which they say is an extraordinary thing; and that if you give to a well Hog an Ounce of crude Antimony, it will make him fat above a Fortnight sooner than another Hog that hath the same Meat, giving half a Drachm at a time. If Hogs get a Swelling on the side of their Throat by eating of Acorns, lance it; and anoint it with Hog's Lard, and it will quickly be well.

Chap. IX. *Of Rabbits or Coneys.*

Rabbits are very profitable Creatures for their great increase, and their being kept on dry barren Sand or Gravel that will maintain nothing else; which the dryer 'tis the better for them; this Sort of Lands they much improve by their Dung for Rye. Besides which many make great Profit of them, by keeping
of

of them in Hutches near great Towns, and some keep great Quantities of them in Pits for to catch, when they want them; they being a very ready dish upon any Occasion: But the Pits must be in a very dry warm Soil; if they are any thing deep, they will be else too cold, or too damp for them. I should rather prefer for them a large Barn made very tight after the way of making of Barns for preserving of Corn in, to keep Vermin out of: For the tame Rabbits must lie dry, and warm, or else they will not breed in Winter, which is the chief time of their Profit, and what makes them preferred before the wild ones, and they are much better Meat, if they have their Liberty; especially the white shock Turkey Rabbet.

Chap. X. *Of Dogs.*

DOgs are not reckoned among the Number of the profitable Cattle, but as they are upon several occasions very useful to the Farmer, and what he cannot well be without; and they being of several Sorts, I shall leave the particular Description of them to the Lovers of Sport, who are the most concerned to be curious in the particular Kinds and Shapes of them. And what I shall propose shall only be some Remedies that may be a help to some of their common Distempers; especially for that of Madness, which is a very prejudicial Distemper, not only in the loss of a good Dog, but in that he may infect the rest of the Stock; and be also very dangerous to the Family and Neighbourhood.

I shall

I shall in this Case, for the publick good advise every one that keepeth a Dog, to have him wormed, which is a thing of small Trouble or Charge, and what I believe will prevent their being mad, if they are not bit with a Dog that is mad; and if they are, I am apt to think it prevents their biting of any other Creature; for I had three Dogs bit with mad Dogs at three several times that were wormed; and though they died mad, yet they did not bite or do any mischief to any thing I had. And having a mind to make a full Experiment of it, I shut one of them up in a Kennel, and put a Dog to him that I did not value. The mad Dog would often run at the other to bite him, but I found his Tongue so big swell'd in his Mouth that he could not make his Teeth meet. This Dog (though I kept him with the mad Dog 'till he died) did not ail any thing, though I kept him two Years afterward, and gave him no Remedies to prevent any Harm from the biting of the mad Dog. But as there are several sorts of Madnes in Dogs, so I cannot tell whether the Effects are the same in all. But my Dogs seemed to die of the black Madnes, which is reckoned the most dangerous. And therefore I cannot tell how far the following Receipt may be effectual in all Sorts of Madnes, tho' it has not failed in curing all the Dogs that were bitten, I have given it to; tho' all those I gave it not to, died. The Remedy is this. "Take white Hellebore and grate it
 "with a Grater to Powder, which mix with
 "Butter and give it to the Dog. The Dose must be proportioned to the size of the Dog; to a very small Lap-dog you may give three Grains, and to a large Mastiff sixteen Grains;
 and

and f
 way
 You
 work
 mit,
 little
 them
 Night
 but w
 After
 the ne
 them
 likew
 of it f
 he ha
 let hin
 times
 up we
 I h
 veral
 with
 of Bu
 a Ho
 being
 take n
 boil it

T
 stocke
 yield
 Brood
 ger th
 them,

and so in proportion to other sizes. The best way is to give but a small Quantity at first: You may increase the Dose as you find it to work, or not to work. But as 'tis a strong Vomit, and what will make them very sick for a little time; so you must be careful to keep them warm that Day you give it, and the next Night, and do not give them any cold Water; but when it hath done working, towards the Afternoon, give them some warm Broth: And the next Morning give the same before you let them out. This is an extraordinary Remedy likewise for Mange; I never knew three Doses of it fail of curing any Dog that had it, except he had a Surfeit with it: Which if he have, let him bleed also, and anoint him two or three times over with Gun-powder and Soap beat up well together, and it will cure him.

I have heard of a Gentleman who cured several Creatures that were bit with mad Dogs, with only giving them the middle, yellow Bark of Buckthorn, which you must boil in Ale for a Horse or Cow, and in Milk for a Dog; and being bit with one himself, he adventured to take nothing else, and did very well. You must boil it 'till 'tis as bitter as you can take it.

Chap. XI. *Of Fowls.*

THE Country-man's Farm or Habitation cannot be said to be compleatly stored or stocked without *Fowl* as well as Beast, which yield a considerable Advantage by their Eggs, Brood, Bodies and Feathers. Any poor Cottager that lives by the High-way-side may keep them, they being able to shift for themselves
the

the greatest Part of the Year, by their feeding on Insects, Corn, or any thing almost that is edible by any other Sort of Animal: And therefore they are kept to great Advantage at Barn-doors, and other Places, where Corn or Straw is scattered.

As for Cocks and Hens, I shall not enter into a Description of the several Sorts of them, only advise you to chuse those that are the best Breeders, and the best Layers; the oldest being always reckoned the best Sitters and the youngest the best Layers; but no sort will be good for either, if they are kept too fat: The best Age to set a Hen for Chickens, is from two Years old to five; and the best Month to set them in, is *February*, tho' any Month between that and *Michaelmas* is good. A Hen sits twenty Days, whereas Geese, Ducks and Turkeys sit thirty. Observe to let them have constantly Meat and Drink near them while they sit, that they may not straggle from their Eggs, and chill them.

One Cock will serve ten Hens.

If Fowls are fed with Buck or French-Wheat, or with Hemp-feed, they say they will lay more Eggs than ordinary; and Buck-Wheat either whole or ground, and made into Paste, which is the best way, is a Grain that will fat Fowls or Hogs very speedily; but the common Food to fat them with, is Barley-meal wet with Milk or Water: but Wheat-flower is better.

Chap. XII. Of Geese.

Geese are profitable many ways, as for Food (for which they commonly bear a good Price)

Price
will
and
shou
Geese
of Sp
and
Eggs
Ge
ter;
a seco
or six
they
Mou
tinuin
Goose
fair a
days
some
days,
Bran,
let th
take
to def
them
One C
If y
them
and t
Be fur
small
hasten
Geese,
bout 1
they
which
way:
VO

Price) their Feathers and their Grease. They will live upon Commons or any sort of Pastures, and need little Care or Attendance; only they should have plenty of Water. The largest Geese are reckoned the best: But there is a sort of *Spanish* Goose, that is a much better Layer and Breeder than the *English*; especially if the Eggs are hatched under an *English* Goose.

Geese lay in the Spring, the earlier the better; because of their Price, and of their having a second Brood. They commonly lay twelve or sixteen Eggs a-piece. You may know when they will lay by their carrying of Straw in their Mouths; and when they will sit by their continuing on their Nests after they have laid. A Goose sits thirty days; but if the Weather be fair and warm, she will hatch three or four days sooner. After the Goslings are hatched, some keep them in the House ten or twelve days, and feed them with Curds, Barley-meal, Bran, &c. After they have got some strength, let them out three or four hours in a day, and take them in again, till they are big enough to defend themselves from Vermin. Others put them out at first, and I think they do as well. One Gander will serve five Geese.

If you would fat Green Geese, you must shut them up when they are about a Month old, and they will be fat in about a Month more. Be sure to let them have always by them in a small Rack some fine Hay, which will much hasten their fattening. But for fattening of older Geese, 'tis commonly done when they are about six Months old, in or after Harvest, when they have been in the Stubble Fields, from which Food some kill them, which is a good way: But those that have a mind to have them

very fat, shut them up for a Fortnight or three Weeks, and feed them with Oats, spelted Beans, Barley meal, or Ground-Malt mixed with Milk, the best thing to fatten them with being Malt mixed with Beer. But in fattening of all Water-Fowl you may observe that they usually sit with their Bills on their Rumps, where they suck out most of their Moisture and Fatness, at a small bunch of Feathers which you shall find standing upright on their Rumps, and always moist, with which they trim their Feathers, which makes them oily and slippery more than other Fowls Feathers are, that the Water may slip off them, which if cut away close, will make them fat in less time, and with less Meat than otherwise. Geese will likewise feed on, and fatten well with Carrots cut small and given them; or if you give them Rye before or about *Midsummer*, it will strengthen them, and keep them in health, that being commonly their sickly time.

In some Countries they shear their Geese for their Feathers, and some pull them twice a Year; but this latter way is more injurious to them, and therefore 'tis better staying till Moulting-time, and till their Death for their Feathers.

Chap. XIII. *Of Ducks and other Water-Fowl.*

TAME Ducks are very necessary for the Husbandman's Yard, in that they require no charge in keeping; they live on lost Corn, Worms, Snails, &c. for which reason they are very good for Gardens. Once in a Year

Year they are very great Layers of Eggs, especially a sort of Duck that turns up the Bill more than the common kind; and when they sit they need little Attendance, except to let them have a little Barley or Offal Corn and Water near them, that they may not straggle far from their Nest to chill their Eggs. For the ordering of their Young, 'tis much the same way with that of Geese. They are reckoned to be better hatched under a Hen than a Duck; because while they are young, the Hen will not lead them so much into the Water. Some reckon it very good to cut off the Feathers of their Rumps; because when their Tails are wet, it often occasions their drowning. As to the fatting of them, you may do it in three Weeks time, by giving of them any kind of Corn or Grain, and good store of Water. Ground Malt wet with Milk or Water is best.

If you would preserve wild Ducks, Teal, Widgeon, Shell-ducks, &c. you should have a place walled in with a Pond in it, that hath good shelter upon some Island or Place near it, that the Duck may hide her Eggs from the Drake, who will suck them if he finds them.

There is likewise a sort of Ducks called Decoy-Ducks, that will bring whole Flights of Fowl to their Retirements, where are Conveniencies made for the catching of them.

Chap. XIV. *Of Turkeys.*

Turkeys are a Fowl that prospers very well in open Countries, where there is not much shelter to harbour Vermin to destroy them; for they are subject to ramble. The

Hens likewise are so negligent of their Young that whilst they have one to follow them, they never take any care of the rest; and therefore there must be a great deal of Care taken of them while they are young to watch them, and to keep them warm, they being an extreme chill Bird. But some, where they have a Convenience of a small Covert near their House, let them take their Liberty, and seek their own Nests; but 'tis only in some particular places that they do well with such Management. I knew a Gentleman that had a Hen-Turkey of the wild kind from *Virginia*; of which, and an *English* Cock, he raised a very fine Breed, that bred wild in the Fields, and always became tame when grown up; they were a very hardy Breed, and much larger than ours, and reared their young Ones without any Care or Trouble, breeding much better than our *English*.

If you keep them with Corn, they are very great Feeders, and will devour a great deal; but if left to their Liberty when grown up, they will get their own Livings without either Trouble or Charges, by feeding on Herbs, Seeds, &c.

Turkeys being very apt to straggle, will often be laying their Eggs in secret Places; and therefore the common sort of them must be often watched, and made to lay at home. They begin to lay in *March*, and will sit in *April*. Eleven or thirteen Eggs are the most they should sit on. They hatch in between twenty five and thirty Days: And when they have hatched their Brood, be sure to keep the young ones warm; for the least Cold kills them: Feed them either with Curds, or green fresh Cheese

Cheese cut in small pieces. Let their Drink be New Milk, or Milk and Water. Some give them Oat-meal and Milk boiled thick together, into which they put some Wormwood chopp'd small, and sometimes Eggs boiled hard, and cut in little pieces. You must feed them often, for the Hen will not take much care of them, and when they have gotten some strength, feed them abroad in some close walled place, where they cannot stray, and do not let them out till the Dew is off the Grass, taking care to have them in again before Night, because the Dew is very prejudicial to them.

For the fatting of Turkeys, sodden Barley is very excellent, or sodden Oats for the first Fortnight, and for another Fortnight, cram them as you do Capons. They are only to be crammed in a Morning, which must be given to them warm, and let out all day, being sometimes fed with Corn while out; because, being a sullen Bird, they are apt else not to fat so kindly. Their Eggs are esteemed very wholesome, and a great Restorer of Nature.

Chap. XV. *Of Pigeons.*

Pigeons or Doves are of several sorts, both the wild and tame Kind, as Wood-pigeons, Rock-pigeons, Stock or Ring-doves, Turtle-doves, Dove-coat-pigeons, and several sorts of tame Pigeons, that are commonly fed by hand, and kept for the largeness of their Bodies, Beauty and Diversity of their Colours. They breed almost every Month of the Year. We shall only treat here of such as are or may be kept in Dove-coats, which bring a considerable Ad-

vantage to their Owners, with little Cost or Trouble, only the feeding of them in Frost or Snowy Weather, when nothing is to be had abroad ; and about Midsummer, before Pease are ripe, which Time is usually called *Benting-time*, because then Necessity forceth them to feed on Bents or Seeds of Bent-Grass ; about which time they usually have a great many Eggs and young Ones, which will be starved if they are not helped. But Pigeons thrive best in open Countries, because there generally is the most Corn : And the Gunners cannot get behind a Hedge to shoot them ; especially in such Countries as they sow a great many Gray-pease and Horse-beans in ; for they are sowed the first of any sort of Grain ; their early feeding on which occasions them to be forwarder in breeding than in other places. Buck-wheat or Brank is also very good to feed Pigeons with to make them lay and breed.

There is nothing the Pigeons more affect than Salt ; for they will pick the Mortar out of the Joints of Stones or Brick-walls meerly for the Saltness thereof ; therefore many give them as often as need requires, a Lump of Salt which they usually call a Salt-cat, made for that purpose at the Salterns, which makes the Pigeons much affect the place. If Lime be mixed with Sand, Loam, and a little Salt put to it, and laid near, or put into the Pigeons-house, they will delight much to pick it : But it must not be made so strong as common Mortar.

Where I formerly liv'd, I got a pair of Ring-doves Eggs, and hatch'd them under a tame Pigeon, and they liv'd with the Pigeons, and bred much better than the Pigeons, that in a little time I had great increase of them ; so that

I believe I might have stocked a Dove-coat with them. They are much better than any other sort of Pigeons, for the Largeness of their Bodies and their Hardiness; and in Winter-time they will live upon Ivy-berries, Turneps, and a great many other things that Pigeons will not. But being oblig'd to remove my Habitation, I have not since been able to make a thorough Experiment of them. I suppose Turtle-Doves will do the same, because I have often seen in the Road going to *Epsom* near *Nonfuch* Park, among a Flock of Pigeons that is commonly thereabouts (which I suppose belongs to some Gentleman near that place) a great many of that sort with them, and are as tame as the Pigeons. Pigeons are sometimes apt to be scabby on the Backs and Breasts, which Distemper will kill the young Ones out-right; and makes the old Ones so faint, that they cannot take their flights to procure Meat, which starves them by degrees, so that whole Dove-coats are often destroyed with it. To cure which Distemper,

Take a Quartern of Bay-salt, and as much common Salt, a Pound of Fennel-feed, a Pound of Dill-feed, as much Cummin-feed, and an Ounce or two of *Assa-fœtida*: Mix all these together with a little Wheat-flour, and some fine worked Clay; when it is well beat together, put it into two Pots, and bake them well in an Oven; and when they are cold, lay them long-ways on the Stand or Table in the Dove-house.

Chap. XVI. *Of Swans.*

SWANS are commonly kept for their Stateliness and Beauty, tho they are very useful to keep Ponds and Rivers clear of Weeds, upon which, and Grass they only feed and not upon Fish, as many pretend, and are neither chargeable nor troublesome to keep, if you have but room enough for them. The young Cignets are extraordinary good Meat, if fatted with Oats, their Flesh being the best of all Water-Fowl; but if fed with Weeds, they taste fishy; therefore the best way is to put them where there is a good quantity of Weeds, and to get them as fat as you can with them, and then to feed them for three Weeks or a Month with Oats put in a Trough in Water. But they being a large Fowl, must not be kept in a strait place, because their Dung will taint them; but in some inclosed Pond where they may have room to come ashore and plume themselves.

They commonly lay seven or eight Eggs, sometimes ten or eleven, but seldom have patience to hatch them all; tho' I have known a Swan to have nine young Ones; but their common Number is four or five. The Hen sits about six Weeks; and if while she sits you set some Oats once in a day in a Trough in the Water somewhere near her; if she have not plenty of Weeds just at hand, it will do well to prevent her leaving of her Eggs; and likewise if you set up some Boughs or other shelter to preserve her from the Heat of the Sun.

Chap.

Chap. XVII. Of Peacocks.

PEACOCKS are usually kept for their Beauty and Comeliness, and more for Variety and Pleasure than Profit, except near great Towns, where many Customers may be found to purchase them. They are beneficial to the Places where they are kept, by clearing of them from Snakes, Adders, Efts, &c. upon which they will live. The young Ones, some say, are extraordinary Meat; but then they should be kept up three Weeks or a Month before they are killed, and fed with Corn, and not suffer'd to feed on their usual Food.

Chap. XVIII. Of Pheasants, Partridge and Quail.

THESE being troublesome and chargeable to keep, because the young Ones must for the first Month be fed with Ants-Eggs, and for the cost of the places that should be made to keep them in, (tho' some make advantage of them near *London* to sell to Gentlemen as Rareties; especially those that have the white Breed, and such as are very fine colour'd, having Rooms and Places made on purpose to keep them in;) only if Pheasants and Partridge are sick, give them Millepedes and Earwiggs, and they will cure them. I shall recommend them rather to Gentlemen than to the Farmer; and proceed to consider his Advantage from that of Insects.

For

For over and above his Stock of Cattle and Fowl, wherewith the Country-Farmer is replenished, there are several sorts of Insects that being judiciously and carefully manag'd, may, bring into the Husbandman's Purse no small Advantage. Amongst many of them that are useful in several Countries, and to several Ends and Purposes, we have here only two that are familiarly known and preserved amongst us which is the Bee and the Silk-worm, of which we shall treat apart ; and first

Chap. XIX. *Of Bees.*

BEES are to be valued for their Profit, and the small Trouble that attends them, there being no Fruit nor Flower, no Wood nor Forest, no Hill nor Dale, no fruitful nor unfruitful Soil, but what affords them matter to work upon ; nor is there any time wherein they are idle, except the extremest cold and wet Season.

Apiary.

A convenient and necessary place ought to be made choice of for your Apiary, or Beegarden, to place your Hives in ; which, if 'tis near the House, is the most convenient for to look after at swarming times, and on other occasions : Let it be securely fenced from all Cattle, especially Hogs, and from all sorts of Fowl, whose Dung is very prejudicial to them, and be well defended from high Winds on every side with such Fences as may let the Sun to them ; but the North should be shelter'd with some high Buildings or Brick-wall that is solid, that it may keep the Wind from coming through it as well as over it : That place being best for them, that is most exposed

to

to the South, and where they may have the best opportunity to settle at their Hives, when they come loaden home.

It is also very convenient to plant several Trees and Shrubs at some reasonable distance, near home, for them to pitch on at their swarming, that they may not be in danger of being lost for want of a Lighting-place. Limes, Phillyreas, Sycamore-Trees and Firrs, are particularly good to be planted near them; because from their Flowers they draw a great deal of Honey and Wax.

The place being fitted, the Seats to set the Hives on are to be provided; which, whether they be Stools or Benches, must be set a little shelving, that the Rain may neither run into the Hive, nor stay at the Door.

*Seats or
Stools.*

'Tis not reckon'd good to set any Hives on a Bench; because in Winter it may cause the Bees to fight, by going into one anothers Houses, which they may sometimes mistake for their own; and therefore some esteem single Stools best, which are to be set at about two Foot distance from one another, and to be supported with four Legs, about twelve or fourteen Inches from the Ground. For their size they should not be above half an Inch or an Inch bigger than the Hive, save only before, where there ought to be the space of three or four Inches, that the Bees may have room enough to light upon it. The best Stools are of Wood. Those of Stone are too hot in Summer, and too cold in Winter.

The Stools should be set towards the South, or rather a point or two to the West, that the Hive may somewhat break the East-wind from
the

the Door, and stand in strait Rows from West to East.

*A Cot or
House.*

Mr. *Worlidge* proposes to make for every Hive of Bees you intend to keep, a Cot or House of about two Foot square, and two Foot and a half high, set on four Legs, about ten Inches above Ground, and five or six Inches within the Ground, and cover'd with Boards or Tyles to cast off the Rain, the Back or North-side being closed up very close, and the East and West-sides to have Doors to open and shut at pleasure, with Hasps to them, and at the Face or South-side to have a Falling-door that may come about half way down, which is to be elevated at pleasure, and serves in Summer for a Pent-house; not only to beat off the Rain from the Hives, but to defend them from the extreme heat of the Sun, which is apt to melt their Honey. The other lower half should have two small Doors to open to either hand, which will serve to defend the Holes of the Hives from injurious Winds. When the Winter approaches, and the cold Winds are like to injure the Bees, you may then fasten all the Doors, which will defend the Bees from the Extremes of Heat and Cold, both which are injurious to them.

In Winter if you find them stand too cold, you may stuff Straw within the Doors to keep them warm; but the Extremity of Cold doth not do them so much Injury as Wet; which these Cases best preserve them from. They likewise prevent the Bees getting abroad upon every Sun-shine-day, because the Hives stand six or eight Inches within the Doors, which makes them dark, and the Bees insensible of a small Heat; when after the common way of Stools

or

or Benches, the Sun casts its Rays to their Doors; which Warmth and Light together excites them forth to the expence of their Provision, and the loss of their Lives, as is evident by frequent Experience; the mildest and the clearest Winters destroying or starving the most Bees; whereas the coldest and most frosty Winters best preserve them.

In Spring as soon as the Willow or Withy Blossoms appear, you may open the under Doors, that the Light and Warmth of the Sun and Air may encourage them to work; or else you will hinder their early breeding, and make them slothful.

Several sorts of Hives are used in several *Hives.* Countries; but the general sort used in *England* is Wicker-hives made of Privet; Willow or Harl daub'd with Cow-dung temper'd with Dust, Ashes or Sand; or Hives made with Straw bound with Brambles: Some out of Curiosity that they may see the Bees work, have them made of Wood with Glass, but they are very cold; so that Bees do not thrive well in them. Others have placed double Hives one by another, and some upon the tops of others, that so by the taking of one of them away they may leave the other for the Bees without driving or killing of them: But as I cannot find any of these Experiments brought to perfection; so I shall refer the treating of them till I can get a full account of some experimental Progress that is made in them.

The best Hives, and those that are the *Form.* most in use and warmest, are the Straw-hives, the bigness of which should be of between five and seven Gallons, of a round Form, rather broad than high; but you ought to have of each

each fize, that you may fuit your Swarms to them according as they are bigger or leffer; and where you design to multiply your Stock, make use of the small Hives, and of the larger where you desire a great deal of Honey.

*Trimming
the Hives.*

Your Hives being thus made, you must dress them after this manner: Take off all the staring Straws, Twiggs and Jaggs that are offensive in the Hive, and make them as smooth as possible. If you need but few Hives, you may prune them with a Knife: If many, singe and rub them with a piece of Brimstone.

Spleets.

Your Hive being pruned, put in your Spleets three or four of them, as the largeness of your Hive shall require: The upper Ends whereof set together at the Top of the Hive, and the lower fasten about a handful above the Skirt. Besides these Spleets the Straw-hive should have four other Spleets driven up into the Skirts to keep the Hive from sinking when it is loaded; two of which are the two Door-posts, the other two are hind Posts set at equal distances.

Dressing.

In Swarming time the Hives that you are minded to use, rub with sweet Herbs, as Thyme, Baum, Savoury, Marjoram, Fennel, Hyssop, Bean-tops, &c. and when the Swarm is settled, take a Branch of the Tree whereon they pitch, and wipe the Hive clean with it, and wet the inside of the Hive with Honey, Mead, Salt and Water, Small-beer, or Honey and Milk, or Sugar and Milk.

In the next place your Hives must be kept close for defence of your Bees, first, from the Cold by mixing of Cow-dung with Lime or Ashes, and with Sand, with which you must stop up the Edges of the Hive round, and against Winter put a Wicket of a small piece of

of Wood, in which are three or four Notches cut just big enough for the Bees to go in and out at, that no Vermin may get into them.

If the Spring be mild, calm and showering, *Swarming* 'tis good for Swarms; and they will be the earlier: But if it proves a cold, dry, windy Spring, then will there be but few Swarms, and those also backward. Dry Weather makes plenty of Honey, and most of Swarms.

About the middle of *May* in an early Spring, you must begin to look after them, and observe what you can of the usual Signs that precede their Swarming, that you may be the more watchful over those that require it. When the *Hives* are full (before which they will never swarm) they will cast out their Drones, altho' they be not quite grown, and the Bees will hover about the Doors. In cold Evenings and Mornings there will be a Moisture or Sweating upon the Stool, and they will continually be running up and down hastily, and lie out in sultry Evenings and Mornings, and go in again when the Air is clear.

If the Weather be warm and calm, the Bees delight to rise; but especially in a hot gleam after a Shower or gloomy Cloud hath sent them home together. Then sometimes they gather together without at the Door not only upon the Stool, but the Hive also: Where when you see them begin to hang in Swarming-time, and not before, you may be sure they will presently rise if the Weather hold.

To lie forth continually under the Stool or behind the Hive, especially towards the middle of *June* is a sign or cause of not Swarming: For when they have once taken to lie forth, the Hive will always seem empty, as tho' they wanted

wanted Company, and they will then have no mind to swarm.

Much stormy and windy Weather also will not suffer them to swarm when they are ready, and that makes them lie out; and the longer they lie out, the more unwilling they are to swarm.

Another cause of lying out is continual hot and dry Weather, especially after the Solstice; which causing plenty of Honey both in Plants and Dews, their Minds are so set upon that their chief delight, that they have no leisure to swarm, although they might most safely come abroad in such Weather.

*To make
them
swarm.*

But to make them swarm, some keep the Hives as cool as may be, by watering and shadowing both them and the place where they stand, and then enlarging of the Door to give them air, they move the Cluster gently with their Brush, and drive them in.

If yet they lie out and swarm not, then the next calm warm day about Noon, while the Sun shineth; put in the better part with your Brush, and the rest gently sweep away from the Stool, not suffering of 'em to cluster again. These rising in the calm and heat of the Sun, by their Noise, as tho' they were swarming, will make the other come forth perhaps unto them, and so they may swarm.

Divers other ways have been attempted to cause Bees to swarm, as by placing a large Pewter-platter under the Cluster of Bees as they hang out in the heat of the Sun, so that it may strongly reflect the heat upon them, which will provoke them to swarm.

If

If
swarm
the
the S
not,
TH
When
eight
Brood
Hive
will c
call o
they c
anoth
thrille
great
If
will b
be the
somet
Fortn
anothe
Wh
stom t
tar, E
Cerem
But if
Sand a
Wh
Lighti
knit t
fully
while
having
nesses,
go near
hive a
VOI

If none of these ways will cause them to swarm, but that they lie forth still, then rear the Hive enough to let them in, and cloom up the Skirts all but the Door: If this succeed not, there is no Remedy.

The signs of After-swarms are more certain. *After-
swarms.* When the prime Swarm is gone, about the eighth or tenth Evening after, when another Brood is ready, and again hath over filled the Hive: In the Morning before they swarm they will come down near the Stool, and there they call one another, and at the time of swarming they descend to the Stool, where answering one another in more earnest Manner with thick and shriller Notes, the Multitude come forth in great haste, &c.

If the prime Swarm be broken, the second will both cast and swarm the sooner, it may be the next Day, and after that a third, and sometimes a fourth, but all usually within a Fortnight: Sometimes also a Swarm will cast another that Year.

When the Swarm is risen, 'tis the usual Custom to make a Noise with a Pan, Kettle, Mortar, &c. but some reckon it an insignificant Ceremony, and others esteem it prejudicial. But if they are like to be gone, cast Dust or Sand amongst them to make them come down.

When your Swarm hath made choice of a Lighting-place, you shall quickly see them knit together into a Cluster when they are fully settled, and the Cluster hath been a while at the biggest, then hive them. And having in store several Hives of several bignesses, make choice of one that the Bees may go near to fill it that Year, but rather under-hive a Swarm than over-hive them, and

rub the Hive with sweet Herbs, as is before directed.

*Hiving
them.*

Let the Hiver drink a Cup of good Beer, and wash his Hands and Face therewith, or being otherwise defended, if the Bees hang upon a Bough, shake them into the Hive, and set the same upon a Mantle or Cloth on the Ground, as is usual; or you may cut off the Bough if it be small, and lay it on the Mantle or Cloth, and set the Hive over it, which is the better way.

If they light near the Ground, lay your Cloth under them, and shake them down, and place the Hive over them; and such Bees as gather together without the Hive, wipe them gently with your Brush towards the Hive: And if they take to any other place than the Hive, wipe them off gently with your Brush, and rub the Place with Wormwood, Nettles, May-weed, &c. Then set the Swarm as near as you can to the Lighting-place, till all be quiet; every one knowing his own House.

*Swarm
parting.*

If the Swarms part, and light in sight of one another, let alone the greater, and disturb the lesser Part, and they will fly to their Fellows: But if not in sight, hive them both in two several Hives, and bring them together; shaking the Bees out of one Hive on the Mantle whereon the other Hive stands, and place the other full Hive on them, and they will all take to it.

If it happen that your Swarm come late after the middle of *June*, and that they are small, under the quantity of a peck; then put two or three of them together, whether they rise the same Day, or in divers; for by this uniting they will labour carefully, and gather store of Honey.

Honey, and stoutly defend themselves against all Enemies. The manner of uniting of them is thus :

In the Evening when it waxeth dark, having spread a Mantle on the Ground near unto the Stool, where this united Swarm shall stand, set a Pair of Rests, or two Supporters for the Hive; knock down the Hive out of which you intend to remove your Bees upon the Rest; then lift up the Hive a little, and clapping of it between your Hands to get out the Bees that stick in it, lay it down side-ways by the Bees, and set the Stock or Swarm to which you would add them, upon the Rests or Supporters over them; and they will forthwith ascend into the Hive; those that remain in the empty Hive, by clapping it will hasten after their Companions. When you have gotten them all in, either that Night or early the next Morning, place the Hive on the Stool, &c.

Some reckon it better to place the Hive wherein you have newly put your Swarm you intend to drive into another, in a place that the skirts may be upmermost, and set the other upon it, binding them about the skirts with a Towel : And so let them stand 'till the Morning, and the Bees will all ascend, that you may the next Morning set the Receiver on a Stool : And thus may you put three or four Swarms together : But observe to unite them the same Evening, or the next at farthest, that they swarm; lest having made Combs, they are the more unwilling to part from them.

In these several ways of dealing with Bees, *Bees sting-*
'tis good to defend ones self as well as may be *ing.*
against their Stings; the securest way of doing
of which, is to have a Net knit with so small

Mashes, that a Bee cannot get through; and of fine Thread or Silk large enough to come over your Hat, and to lie down to the Collar of your Doublet; through which you may perfectly see what you do, without any danger, having also on your Hands a good Pair of Gloves; Woollen ones are the best.

If a Bee happen to catch you unawares, pull out the Sting as soon as you can, and take a Piece of Iron and heat it in the Fire; or for want of that, take a live Coal and hold it as near, and as long to the Place as you can possibly endure it, and it will attract the fiery Venom, and afterwards anoint it with some Honey or Mithridate, or if you take a little Spittle and wet it with it, it will cure it.

As soon as a Swarm hath enter'd its Hive, they immediately (if the Weather will permit) gather Wax, and build Combs; that in a few days time there will be large and compleat Combs. They lie so thick about them, that it is impossible one quarter of them can be imploy'd at once, until the Combs are brought to a considerable length, and then a great part of them may be imploy'd in filling them, and the rest in finishing their Cells or Combs.

Their Number towards the End of Summer begins to lessen, for in their Prosperity at Swarming-time, and shortly after they are far more in Number than in the Autumn or Winter, as you may easily discern between the Quantity and Number of a Swarm, and those you kill when you take them; for the Bees of the last years breed do now by degrees waist and perish by their extraordinary labour, their Wings decay and fail them; so that a Year, with some advantage, is the usual age of a Bee, and the young

you
serv
T
to B
not
1.
the
of C
2.
near
brou
the
they
3.
4.
Sc.
Fenc
Stoc
5.
Crea
6.
Spid
deav
the I
7.
they
by r
stroy
a Gla
such
will
8.
both
prov
be b
ping

young only of the last Spring survive and preserve the kind till the next.

There are several things that are injurious to Bees, and much hinder their Prosperity, if not prevented.

1. *Noise*, which may in part be remedied by the Situation of the Apiary free from the noise of Carts, Coaches, Bells, Echoes, &c. *Enemies to Bees.*

2. *Smoak*, where Land hath been Burn-beaten near unto an Apiary, and the Wind hath brought the Smoak towards it, a great many of the Bees have been killed; which is the reason they will not thrive in or near great Towns.

3. *Ill Smells* are very offensive to them.

4. *Ill Weather*, as Wind, Rain, Cold, Heat, &c. which is prevented by the Situation and Fencing of the Apiary, and ordering of the Stocks as before.

5. The *Mice*, *Birds*, and other devouring Creatures which are to be destroyed.

6. *Noisome Creatures*, as Toads, Frogs, Snails, Spiders, Moths, Ants, &c. which you must endeavour to keep from them, and cleanse also the Hives ever and anon from these Vermin.

7. *Hornets and Wasps* in such years wherein they abound, prove great Enemies to the Bees, by robbing them of their Honey: they are destroyed by placing near the Door of the Hive a Glass Vial half full of Beer, Cyder, or any such thing, if some Sugar be added to it, it will do the better.

8. *Bees* themselves prove the greatest Enemies both by *fighting* and *robbing*. Several occasions provoke the Bees to fight; which, if the Battle be but newly begun, may be hindered by stopping up the Hive close: but if they be gone so

far that most of the Bees are out, the casting of Dust among them was the ancient way.

*Removing
of Bees.*

The best time to remove an old Stock is a little before or a little after *Michaelmas*; or, if you have overslipt that time, then about the end of *February*, or beginning of *March*, before they go much abroad, lest it prevent their swarming. You may remove them at any time in the Winter, but not so well as in the fore-mentioned Seasons. The best time of the day to do it is in the Evening, next after Hiving, let the Weather be fair, and do it in the Evening when the Bees are quiet; the best way of doing of which is thus:

Take a Board about the breadth of the bottom of the Hive you intend to remove, and in the Evening, or two or three Evenings before, lift it up and brush the Bees that are on the Stool forward, and let the Board be a little supported by two Ledges, to prevent the Death of the Bees on the Stool. On this Board set the Stock, and so let them stand till you remove them. When you come to move them, stop up the Door of the Hive, and set the Board whereon the Hive standeth, on a Hand-barrow, and carry them to the place you intend.

*Feeding of
Bees.*

The feeding of Bees is of little use; first, because the Bees that have not a profitable stock of Honey to serve them over the Winter, are not fit to Keep: and then because they that are Bee-masters, and have not care enough of them to keep them from spending of that Stock they have in Winter-time, must not expect to reap any considerable Advantage by them; and it may be presumed will never take so much Pains and Care as is required in feeding of them. But as

There

There are some Stocks of Bees in the Spring time that may seem worthy of our care to preserve, *viz.* Such as having but a small Stock of Honey, and a good Quantity of Bees, by means of a cold, dry, unseasonable Spring, cannot make such timely Provision as in other Years they might have done, yet in all probability may prove an excellent Stock, and may be worth our assistance. Food may be afforded to them several ways, but the best is by small Canes or Troughs convey'd into their Hives, into which you may put the Food you give them: The chief time of Feeding of them is in *March*, when they begin to Breed, and to sit on their Young ones, which must be daily continu'd 'till the Spring Season affords them Ease and Provision abroad, because at that time their Combs are full of young Bees. About the middle of *August*, weigh your Hives, and take the heaviest and the lightest, if they do not weigh 14 *l.* they will hardly do.

Of all Food Honey is the best and most natural, which will go the farther, if it is mixed well with a moderate Proportion of good Sweetwort. Some prescribe Toasts of Bread sopped in strong Ale, and put into the Bee-hive, whereof they will not leave one Crum remaining; some also advise to put into the Hive dry Meat, or Flour of Beans; others Bay-salt, roasted Apples, &c. which are very good, especially Salt: which if some were mixed with Water, and always set near them, it might do well, it being certain, that Bees near the Sea always thrive the best; which some attribute to their drinking of Salt-water, which they fly (say some) many Miles to get.

Improve-
ment of
Bees.

Mr. Worlidge proposes for the improvement of Bees, to take a handful of Baum, one Dram of Camphire, half a Dram of Musk dissolved in Rosemary, as much yellow Bees-wax as is sufficient, Oyl of Roses as much; stamp the Baum and Camphire very well, and put them in the melted Wax with the Oyl of Roses, and so make it up into a Mass, letting of it Cool before you put in the Musk; for otherwise the Heat will fume away most of the Scent.

Take of this mass so much as a Hazle-nut, and leave it within the Bee-hive; it will (as he says) much increase the number of the Bees, and you shall also find both of Honey and Wax three times more profit, than otherwise you should have had.

A great thing to advance your Bees is the having of Fields near you, sowed with Brank, Cole-seed or Turneps, from which they will draw great Quantities of Honey. Beans also are good for them.

Profit of
Bees.

As the chief aim of the Keeper of Bees is an Advantage by their Honey and Wax; so many have endeavoured to find out some way to reap the profit of Bees without destroying them.

Driving of
Bees.

One way that has been used for this purpose is driving of them after this manner. In September, or any time after they have done breeding (else the Honey will be corrupted by the young Bees in the Combs) place the Hive you intend to take, with the Bottom upwards, between three or four Stakes, and set the Hive you intend to drive the Bees into, over the same as before was directed, in the uniting of Swarms; then often clap the under Hive between your Hands in the Evening; and so let them stand till Morning; and then clap it again,

and

and get as many Bees out as you can, which will repair to the other Hive. This way is something troublesome to the unexperienced; yet beneficial in such Cases, where you have a great Stock of Honey and few Bees in one Hive, and a small Stock of Honey in another: by which means you save the Lives of your Bees, which will gladly exchange their hungry Habitation for a more plentiful.

But these ways have altogether fail'd the *Profit of*
Designs of the Undertakers, as I said before. *Bees.*

And therefore I shall at present only describe the common usage, which is the taking of the Combs by killing of the Bees, which must certainly be the only way of ordering of them; because 'tis impossible for them to live if you deprive them of their Food; and therefore about the latter end of *August* consider with your self what Stalls you will keep, and what you will kill; the best Swarms to keep are those of one or two Years standing; and those of three or four, which by reason of their Swarming the last Summer, are full of Bees, and are the most likely to be the best: but those of that Age which have cast Hives, not being like to continue, are to be taken, as are also poor Swarms not worth the feeding, and all light Stocks, and such as do not carry out their Dross, and drive away the Drones in good time; also those whom the Robbers easily assault, are to be suspected, and if their Combs be once broken, delay not their taking: and also all Stalls of three Years Old or upward that have miss'd swarming two Years together, especially those that have lain out the Summer before and did not cast the last Summer: for such do seldom prosper; and therefore 'tis better

ter to take them while they are good, than in a vain hope of increase to keep them till they perish. Neither is it safe to trust to any after they have stood five Years and upwards, that have mis'd swarming two Years together, unless it be some special Sort of Bees, which always keep themselves in Heart : such as these may be kept nine or ten Years. Likewise if you have any that are very full of Honey, as some Years some will be, even down to the Stool, one such Stall is worth three or four, and therefore take them in their Season.

Having made choice of your Stalls to be taken, two or three Hours before Sun-setting, dig a hole in the Ground of about nine Inches deep, and almost as wide as the Hive-skirts, laying the small Earth round about the Brims; then having a little Stick slit at one end, and stripp'd at the other, take a Brimstone-match five or six Inches long, and about the bigness of your little Finger, and making it fast in the slit, stick it in the middle or side of the Hole; so that the top of the Match may stand even with the brim of the Pit, or within one Inch of it, and then set another by it dressed after the same manner, if the first be not sufficient. When you have fired the Matches at the upper end, set over the Hive, and presently shut it close at the bottom with the small Earth, that none of the Smoak may come forth; so shall you have the Bees dead in a quarter of an Hour.

The Hive being taken and hous'd, lay it softly on the Ground upon the sides not the Edges of the Combs; and loosen the ends of the splints with your Finger, and the Edges of the Combs where they stick to the sides of the Hive, with a wooden Slice take them out one after another,

another, and having wiped off the half dead Bees with a Goose-feather, break the Combs presently while they are warm into three Parts.

The Honey which first flows of it self from the Combs is called *Virgin Honey*, (as is also the Honey which comes from the first Years Swarm) This is the best and finest Honey, being more chrySTALLINE and of a finer Taste than that which is squeezed out of the Combs, and so may be kept for particular Uses, or for the making of the finest Mead, for the ordering of which I shall refer you to my Treatise of *English Liquors*; and shall conclude at present with giving you some account of the way of ordering your Honey and Wax, with the Virtues of them, that you may be the more sensible of the Advantages that accrue to Mankind by this small Insect.

When your Combs have run out as much as they will, put it up warm into Pots by it self; this being the finest Honey, as I said before; and it will for two or three days time work up a Scum of course Wax, Drofs, and other stuff, which must be taken off. The other Honey which is the courser Sort, you must get from the Combs, by pressing of them, which you may Pot also, except what you design for the present to make Metheglin with; which being done, what remains put into a Hair-bag and wash in a Trough or other Vessel to make Mead or Metheglin; and when the sweetness is all washed out, being crushed dry, the Balls try for Wax.

The manner of ordering of which is as followeth:

Take the Wax and Drofs, and set it over the Fire in a Kettle, or other Vessel that may easily
con-

contain it, and pour in so much Water as will make the Wax swim, that it may boil without burning, and for this reason while it is gently boiling over the Fire, stir it often; when it is thoroughly melted, take it off the Fire, and presently pour it out of the Kettle into a Strainer of fine thin Linen, or of twisted Hair ready placed upon a Screw or Press, lay on the Cover, and press out the Liquor (as long as any Wax comes) into a Kettle of cold Water, but first wet both the Bag and the Press to keep the Wax from Sticking: at the first cometh most Water, at the last most Dross, and in the middle most Wax.

The Wax growing hard make it into Balls, squeezing out the Water with your Hand. Which when you have done, break all the Balls into Crums, and in a Kettle or Skillet set it over a soft Fire: While it is melting stir it and skim it with a Spoon wet in cold Water; and as soon as it is melted and scummed clean, take it off, and pour it into a Pan or Mould, besinearing the bottom and side, first with Honey, (the Wax being as cool as it will run thro' a Linen Strainer :) when you come near the Bottom, pour it gently, till you see the Dross come, which strain into some other thing by it self: and when it is cold, either try it again, or having pared away the Bottom) keep it for use.

When the Wax is in the Pan or Mould, if there is any Froth remaining on the Top, blow it together at one side, and skim it off gently with a wet Spoon. This done, set not the Cake abroad where it may cool too hastily, but put it in a warm House not far from the Fire; and if it be a large Cake, cover it warm to keep the Top from cooling till the inward Heat be allay'd,

allay'd, and so let it stand, not moving of it till the Cake be Cold: if it stick, a little warming the Vessel or Mould will loosen it; so that it will presently slip out.

The Properties of good Wax are, that it is yellow, odoriferous or sweet, fat, fast or close, light, pure, being void of any other matter. 'Tis always a ready Money Commodity, especially *English Wax* which is much better than Foreign, and commonly sells for about five or six Pound a Hundred; it being of extraordinary use both in Chirurgery and Physick; beside the use that is made of it for Lights, the cleanness and sweetness of which makes it preferr'd before all other Sorts.

As to its Chirurgical or Physical Vertues, 'tis reckon'd a mean between Hot and Cold, between dry and moist, being the Ground of all Cerecloths and Salves; it mollifies the Sinews, ripens and resolveth Ulcers; the Quantity of a Pea being swallowed down by Nurses, dissolveth the Milk curdled in the Breast. It's Oyl is of excellent Virtue to cure Wounds, be they never so large or deep (being before stitched up) in ten or twelve days at the most, and healeth small Wounds in three or four days, by only anointing the Wound therewith: and applying a Cloth wet in the same stayeth the shedding of Hair, either on Head or Face, by anointing therewith. And 'tis as good for inward Diseases, if you give one Dram at a time in White Wine, it will provoke Urine, help Stitches and Pains in the Loins, the Cold Gout and all other Grievs coming of cold.

Honey is little inferiour, either as to its benefit or usefulness; 'tis of subtil parts; and therefore doth pierce as Oyl, and easily passes
the

the Parts of the Body; it hath a Power to cleanse, and some sharpness withal; and therefore it openeth Obstructions, and cleareth the Breast and Lungs of those Humours that fall from the Head: it looseneth the Belly, purges the foulness of the Body, and provoketh Urine; it nourisheth very much, and breedeth good Blood; it prolongeth Life, and keepeth all things uncorrupted which are put into it; and therefore Physicians do temper therewith such Medicines as they design to keep long. 'Tis good for such as have eaten Mushrooms, or drunk Poppies; it's an eminent Ingredient in the great Antidotes of Treacle and Mithridate, and is good against Pleurifies, Phthisicks, and other Diseases of the Lungs. But 'tis for any Distemper much better to be taken clarified than raw, it being thereby made more nourishing, lighter of Digestion, and less laxative, as also less sharp, &c.

Chap. XX. *Of Silk-worms.*

Silk-worms are another Insect of great Advantage to the Farmer in other Countries, and might certainly be so in this Island; as well as in *New England*, *Virginia*, and even *Barbadoes* and *Jamaica*, without hindrance to any of their other Affairs. In *England* the great Obstacle seems to be the want of Food for them. Mulberry Leaves being the only Food that I believe will Feed and Cherish them to advantage, tho' some have affirmed, That they will eat White-thorn, Lettice, Dandelion, Poplar, Plumb and Apple-tree Leaves, the certainty whereof I shall leave to be decided by Experience. Of Mul-

berries

berries there are two Sorts, the Black and the White ; the former sort is the usual Sort given to them in *England* : but the White is most esteemed in Foreign Parts, there being very large Plantations of them raised for that purpose in all the Silk-Countries : it's Leaf is much finer than that of the Black, and therefore must be much better for the young Ones. I am apt to believe it nourishes them much better than the Black : but about the ordering of this Tree see my *Treatise of Trees* following.

About the beginning of *May* when the Mulberry begins to spread its Leaf is the time that the Silk-worms Eggs are, as it were by Nature, adapted for a release from their Confinement. At which time, and not before, lay them in some Window in the Warm Sun, or carry them in a little Box between some pieces of Say, in some warm place about you, keeping them warm in the Night, they will soon appear. And when they are come out of the Shell, cut some Paper full of small Holes, and lay over them, and over that some of the Young Mulberry Leaves, and they will easily find their way to their Food. After they are come to feeding, you may place them on Tables or Shelves at convenient distance according to the number of Worms that you have.

They are Sick four times in their feeding, the first commonly about twelve days after they are Hatched, and from that time to the end of every eight days, according to the Weather, and their good or ill usage ; during the time of their Sicknes, which lasteth two or three days, you must Feed them but very little, only relieve such of them as have past the Sicknes before the rest, and those that shall not fall into their

their Sickness: at this time they grow clearer, shorter and thicker than they were before, and more drowfie.

*Time of
Feeding.*

The whole time of their feeding is about nine Weeks, during which time you may feed them twice a day by laying the Leaves over them as it were to cover them, and they will soon find their way through them; and as they grow in strength and bigness, so you may feed them more plentifully and often. It is good to let the Leaves be clear of Dew or Rain before you give them unto the Worms; you may keep them spread on a Table in case they be wetter, you may gather and keep them two or three days without any great Inconveniency, in case you live remote from Mulberry-trees, or the Weather be changeable.

*Cleansing
of them.*

You must observe to rid your Shelves often of their Dung, and the remainder of your Leaves, by removing of the Worms when they are fast on the new Leaves laid them, for then may you remove easily the Worms with the Leaves: keeping clean the Shelves and the Room being the principal means to preserve them. Likewise remember to keep the Room warm in cold and wet Weather, and to give them a little Air in hot Weather.

Let not the Room you keep them in be too near the Tiles on the Top of your House, nor in any cold or moist Room below; but be sure to avoid all extremes.

When they have fed as long as they are able, they look of a clear Amber or Fresh colour, and are then ready to go to work; at which time be sure to give them what Air you can. Therefore 'tis then advised, that you make Arches between their Shelves with Heath made
very

very clean, or with Branches of Rosemary, Stalks of Lavender, or such like: whereupon the Worms will fasten themselves, and make their bottoms, which in about fourteen days are finish'd.

But the best way is to make small Cones of Paper, and place them with their sharp end downward in Rows, in each of which put a Worm as they appear to you to be ready to go to work, and there will they finish their bottom more compleat, and with less waste than any other way.

In their working the first day they make only a Web; the second, they in this Web form their Cases, and cover themselves all over with Silk, the third day they are no longer seen, and the days following they thicken their Cases, always by one end or thread which they never break off themselves. Let them not any ways be disturb'd in their work, that all the Silk in their Bellies may come out.

When they have finish'd their bottoms, which will be in about fourteen days; take so many as you intend for Breeders, and lay by themselves, *viz.* the first done, and them that are the hardest, reddest, and best coloured must be chosen, and likewise as many Male as Female Cases (which are discerned by this, that the Males are more pointed at both ends of the Cases, and the Females more obtuse at the ends, and bigger bellied) and that no Cases be taken, but such as you may hear the Worms roll in: and then the Worms within will eat their way out in four or five days time; and when they come forth 'tis advised to put them together on a piece of old Say, Grogram, Velvet, whited brown Paper, or the like, and put

into a Paste-board Box, where they must be kept till next Spring; one of these Females will produce two or three hundred Eggs: so that a few kept for Seed or increase is sufficient. The rest that you do not preserve for breed, put into an Oven, after the baking of Bread, that it may be hot enough to kill the Worms, for the gnawing of their way out, is some prejudice to the bottom. Those that are the grossest and blackest are the best to breed on. Care must be taken that no Rats, Mice, Ants or other Vermin, nor yet Hens or Birds come at them, because they are very greedy of them, and also Tobacco smoak kills them.

The Worms will come forth in the Form of a Butterfly, having four Wings, six Feet, two Horns, and two very black Eyes, which being put into a convenient Place, the Males fluttering with their Wings will couple with the Females after that these have first purged themselves of a kind of reddish Humour by the Fundament; in which Posture they are to be left from Morning (which is the ordinary time of coming forth) till Evening, and then the Females are to be gently pulled away, nine or ten Hours being the longest they should be left together: whereupon they will lay their Eggs, having first let fall another Humour esteemed to proceed from the Seed of the Males: but the Males are then to be thrown away as useles.

The Seed or Eggs at first coming out is very White, but in a day or two it becomes Greenish, then Red, and at last by little and little Gray, which colour it retains always after.

When you have obtain'd your bottoms, take off the Bags, and having found their end, put six, ten or more ends in a Bason of Water together

gether where a little Gum Tragacanth is mix'd, and so you may easily wind them. The small Hairs of Silk seldom break: but if they do, they are easily found again, except the Worms are ill fed: then the Silk is small and easily breaks.

Another way to make these gummy Bottoms wind easie is this, take Soap-boylers Liquor or Lee which is very sharp and strong, and put your Bottoms therein, setting them over the Fire, till the Liquor be scalding hot, and let the Bottoms remain therein about half a quarter of an Hour till the Gumminess be dissolved, then put the Bottoms into clean scalding Water, and let them lie a while therein and they will easily unwind. A Lixivium made of Wood-ashes very strong will do as well as the afore-said Soap-boylers Liquor.

There is a kind of Tow or rough Sort of Silk that will not wind up with the other, which may be prepared, and good Silk made thereof, and indifferent also of the Bags themselves, but the finest of the English Silk may compare with that of the finest Sorts of any part of the World.

Chap. XXI. Of Fish-ponds.

F*ish-ponds* are no small improvement of watry Boggy Lands, many of which are fit for no other Use; nor is there less profit in making of them in Bottoms between rising Grounds, tho' they are dry Lands, if we consider the usefulness of them for the watering of Cattle, and the keeping of Fish, the Advantage of which, both for the House and Market, few

are sensible of, it being a profit that comes in without any Charge, expence or labour, and likewise the benefit that there is in stopping of the Floods that fall from the Uplands, so as to cause the Washings of the Dung to settle at their bottoms; there being nothing that is a greater Improvement of Sandy or Gravelly Land than Mud produced by the Washings of the upper Grounds.

In making of a Pond, let the head of it be at the lowest part of the Ground, and the Trench of the Flood-gate or Sluce have a good fall that it may not be too long in emptying. The best way of making the head secure is to drive in two or three rows of Stakes above six Foot long, at about four Foot distance from each other, the whole length of the Pond-head, whereof the first row must be rammd at least about four Foot deep, that they may stand strong and sure; or if you find the bottom any thing false, especially if it consist of a running Sand, you may besides lay the Foundation with Quick-lime, which slacking will make it as hard as a Stone. Some lay a Layer of Lime and a Layer of Earth, which is a very great Advantage in the making of the Heads of Ponds, Mill-damms, &c. And then digging your Pond, carry the Earth, and cast it among the Piles and Stakes, and when they are well covered over, drive in another row or two as you see occasion over them, ramming in the Earth in the void Spaces, that it may lie close, and keep in the Water: and so you must continue Stakes upon Stakes, ramming in the Earth till the Pond-head be of the height you design it: The inside of the said Dam must be very Smooth and Straight; and if 'tis made very sloaping

sloaping on each side 'tis the better, leaving a waste to carry off your waste Water in times of Floods or Rains. The depth of your Pond should be about six Foot of Water at the deepest part, and if on the sides are some Shoals for the Fish to Sun themselves in, and to lay their Spawn on, it will be of advantage to your Ponds, as will likewise the having in other places Holes, hollow Banks, Roots of Trees, Islands, &c. for retiring places for your Fish.

When you have finish'd your Pond, and let in the Water, you may store it with Carp and Tench, which do the best together of any Fish, all other Fish being devourers of their Spawn. But I think that if you have variety of Ponds, 'tis better to keep all Sorts of Fish by themselves; except you store a Pond with Fish of Prey, as Jacks or Perch, and then you must put in Roach, Dace, Gudgeons, or other very increasing Fish for them to feed upon: but not a Tench, as most Authors propose. For a Jack or a Perch will as soon, if not sooner seize on a Tench, than any other Fish, as I found by experience in a Pond of mine that a Pike got into by chance.

Gravelly and sandy Bottoms, especially the latter, are the best breeding Ponds; and a fat Soil with a white fat Water, as the washings of Hills, Commons, Streets, Sinks, &c. is the best to fatten all Sorts of Fish; an instance of which I met with from a Gentleman in *Nottinghamshire*, that had a small Pond at the bottom of a Hill, upon the side of which was a small Village, above which was a very good Spring that run thro' the middle of the Town, and met with all the Sinks and other Drains belonging to the Houses, which it constantly (being a very

large Spring) carried into the Fish-pond that was below the Hill, where my Friend assured me, that he had often put in Carps of four or five Inches long, that in a Years time grew to the length of eighteen Inches, which was confirm'd to me by several of his Neighbours, as well as himself; whereas the ordinary growth of a Carp is not above two or three Inches at that time. Only where such Floods are too violent, it may be good to carry some part of them on one side of the Pond, that they may not carry away the Fish; Carp being very apt to float away with fresh Water.

For storing of your Pond, Carp is to be preferr'd for their goodness, quick growth, and great increase, their breeding five or six times in a Year. But as the Female is eight or nine Years old before she breeds, you must take care constantly to keep a good stock of Females of that Age in your Ponds, if you desire a breeding Pond; indeed the Females should never be killed, because they are often very apt to die after their Spawning. The Male Carp must be three or four Years old, and to every Female you may in a Pond that breeds well, put from three or four Males to a dozen or more.

A Pond of an Acre of Land if 'tis a feeding, and not a breeding Pond, will every Year feed well two hundred Carps of three Years old, three hundred of two Years old, and four hundred of a Year old. Carps delight in Marl-pits, or Pits that have clean clay bottoms, new Ponds or old Ponds, full of Weeds, that are warm and shelter'd from the Winds, and that have Grass growing at the bottom or sides, whereon they feed in hot Months. Carp and Tench thrive also mightily in Ponds or Ditches
near

near the Sea, where the Water is a little Brackish: but they do not eat so well as in clear Water. But no Fish will thrive in a Pond, where Roach or Gudgeons are, except Jacks, and those Fish that are in any Pond, that are the most in number, and the strongest largest Fish, will beat the other from their Food, and keep them very lean, if not starve them, and therefore I am for keeping of each sort of Fish in a Pond by themselves. If Grains, Blood, Chickens Guts, &c. be flung into a Pond, it will much help to fatten the Fish, and to increase their growth. If you cleanse a Pond of Weeds, do it at the fall of the Leaf and not in the Spring, because it rather increases than diminishes them.

Your Pond should every three or four Years be drain'd, and your Fish sorted; if 'tis a breeding Pond, you must take out the smaller ones to store other Ponds with, that you may not starve the great ones, which a great stock of small Fish in a Pond is apt to do. And therefore in feeding Ponds 'tis best to keep them pretty near of a Size.

Ponds made at the Head of a Chalky Spring are very good for *Trouts*, which will mightily thrive in them. *Flounders* will both thrive and breed in any Pond, and especially Clay Ponds, and grow much larger than those in Rivers.

All sorts of Bitterns, Herons, Sea-Gulls, Kings-fishers, Water-Rats, Water-Mice, Otters, &c. are very great Enemies to Fish, and therefore should be destroy'd, as much as you can; but the greatest Destruction of Fish in Ponds, is occasion'd by the Frost, to prevent which some propose to break the Ice, and lay in

Pipes, Straw, &c. to give Air to the Fish, all which ways I have found to fail when my Ponds have been foul: but when clean, I have preserv'd them without using of any of these ways; wherefore I cannot but think that 'tis the foulness of the Ponds only that stencheth the Water: and therefore (not only for the Preservation of Fish, but because it much helps their breeding and feeding, by affording of them Earth to feed and lay their Spawn on) I would very often have Ponds cleansed; the Mud whereof doth commonly more than pay the Charge, where you have a good bottom to cast it out on; but as 'tis much more chargeable and troublesome to get out in boggy and springy Bottoms where you cannot Cart it; so I shall advise that all Ponds made in such Places, should be made like Moats, and not broad Ponds, that so when ever you have a mind to empty them, the Workmen may at one or two throws at the most be able to cast the Mud out on the Banks, for the Price of which Sort of Work, every Pole-square of Mud that is twelve Inches deep is worth Six-pence a Pole to fling out, where it may be done at one throw; but where two is required 'tis worth Twelve-pence a Pole, &c.

Having thus given you an Account of the beneficial part of Husbandry, I shall next proceed to the Consideration of several things that are injurious to the Husbandman, with their Remedies.

B O O K VII.

Chap. I. *Of things prejudicial to the Husbandman.*

Great Heats and Droughts are often very *Heat and*
 prejudicial to the Farmer, in that they *drought.*
 exsiccate and waste the moisture and vegetative Nature of the Earth, so that in a dry Year most of our Commons, or open Field Land yield but indifferent Crops either of Corn or Grass: and tho' dry Summers are the most plentiful of Corn, 'tis because we have so much low Ground and Inclosed Lands that are defended from the scorching Heats of the Summer Air; the only remedy to prevent which, are tall Inclosures and plenty of Water: The *First* of which we have given Direction about in the Methods proposed for the planting and ordering of Trees. But the *Second* in many Places is more difficult to remedy, tho' 'tis what may be many ways effected, as

First, By sinking of Wells, which where they are very deep, makes it very troublesome and chargeable to raise the Water.

Secondly, By bringing the Water in Pipes, Gutters, &c. which is easily done where the Spring or Stream from whence you bring it, is higher than the place where you desire to have it.

Thirdly, by raising of the Water with Pumps, Water wheels, &c.

Fourthly,

Fourthly, by making of Cisterns or Receptacles for Water, for either the Rain or Winter-springs to fill, in which the Water may be kept throughout the Summer.

In which sort of Contrivances, we are very deficient. For in the mountainous Countries of *Spain* they have no Water but what they get this way. Also in *Amsterdam* and *Venice* they keep Rain-water in Cellars made on purpose for Cisterns capacious enough to contain Water for the whole Year it being renewed as often as the Rain falls. Therefore the being put to such difficulties for the watering of Cattle, and other Inconveniences for want of Water, as many are in several places, is the effect of our want of Industry and Care, much more Rain falling here than on the Continent where these Pools and Cisterns supply all their Wants for their Houses, Cattle and Gardens : and yet we have thousands of useless Acres for want of so easie a Remedy.

Cisterns.

If you design to make your Cisterns under your House, as a Cellar, which is the best way to preserve it for culinary Uses, you may lay the Brick or Stone with Terrace, and it will keep Water very well : or you may make a Cement to join the Bricks or Stones with, with a Composition made of slacked sifted Lime and Linseed Oyl tempered together with Tow or Cotton-wool. Or you may lay a Bed of good Clay, and on that lay your Bricks for the Floor, then raise the Wall round about, leaving a convenient space behind the Wall to ram in Clay, which may be done as fast as you can raise the Wall : so that when it is finish'd, it will be a Cistern of Clay walled within with Bricks, and being in a Cellar, the Bricks will keep

keep the Clay moist (altho' empty of Water) that it will never Crack. This I have known to hold Water perfectly well in a shadowy place, tho' not in a Cellar. Thus in Gardens, or any other places may such Cisterns be made in the Earth and cover'd over, the Rain-water being convey'd thereto by declining Channels running unto it, into which the Alleys and Walks may be made to cast their Water in hasty Showers. Also in or near Houses may the Water that falls from them be conducted thereunto.

But the usual way to make Pools of Water on Hills and Downs for Cattle, is to lay a good Bed of Clay near half a Foot thick; and after a long and laborious ramming thereof, they lay another course of Clay about the same thickness, and ram that also very well; and pave it very well with Flints or other Stones, which not only preserves the Clay from the tread of the Cattle, &c. but from chapping by the Wind or Sun at such time as the Pool is empty. Note also, That if there be the least Hole or Crack in the bottom, it will never hold Water, unless you renew the whole labour; or you may make a Cistern or Pool to hold Water by daubing of it with Clay and Mortar, and after draw it over with Mortar; if any cleft happen, stop it with a Cement of clean Hair and Tallow mix'd with unslack'd Lime and Yolks of Eggs well beat, and made into Powder, and mix'd well together. I am told that in *Wiltshire* upon the Top of the dry chalky Hills where there is any descent to catch the Water, they make Ponds, the bottom of which they cover with Chalk Rubbish, which they beat small, and when any Rain comes to moisten it, they ram it well, and

Great
Cold.

and drive Cattle into it, and fold Sheep on it, to trample it, and it makes it hold Water.

Heat and Drought do not always attend us, nor do they so frequently afflict us, especially in the greatest Part or Proportion of this Country, but that we have also a share of a super-abundant Cold and Moisture. The Cold that most afflicts the Husbandman, is the bitter Frosts that sometimes happen in the Winter or Spring, and are beyond our Power either to foresee or prevent; yet that they may not injure us so far, as otherwise they might, we shall propose the following Remedies or Preventions.

Some Lands are more inclinable and capacitated by their Nature or Situation to suffer by cold or wet, than others are; as those that lie on a cold Clay or Chalk, more than those that lie on a warm Sand or Gravel; those that lie moist, than those that lie dry; and those that lie on the North or East-sides of Hills, than those that lie on the South or West: therefore 'tis good to plant or sow such Trees, Grains or Plants that can least abide the cold, in such Grounds as are more warmly situated, as I observed before.

And tho' it is not an easie thing to alter the Nature of the Ground, yet 'tis feasible to take away the offensive moisture, that doth so much cool the Land, as I have shewed before in the *methods used for draining of Grounds*: and also to place such Artificial Shelters against the Cold, as may very much remedy this inconvenience; as we see 'tis most evident, that Frosts have a greater influence where the Air hath its free Passage, than where it is obstructed; for which end, Inclosures and planting of Trees, &c.

are

are a great Preservative, especially such Inclosures as are made in *Cornwal* and *Devonshire*. The Bank-fence is likewise a good shelter for the Land and the Cattle.

And though great Rains and too much Wet ^{Wet} prove injurious to such Lands as are of themselves moist and flat, as I said before; yet the greatest Injury they do to the Husbandman is in Harvest-time, against which the best Remedy is Expedition.

Worthy of Commendation is the Practice used in several places of laying up their Wheat-sheaves in very large Shocks or Heaps in the Fields, so as to abide any Wet. The manner of doing of this I have already describ'd. Whereas in other places they leave all to the Weather, (though their Land lie remote from Barns) to their very great Damage. So much are some People guided by the Custom of the Place, rather than their own Reason.

Where Lands lie two or three Miles from the Owner's Barns, as in some Places in *Champaign* Countries they do, the cover'd Reek Staval (much in use Westward) must needs prove of great advantage in wet Harvests.

Where Lands lie at a far distance one from another, several Barns built as the Land requireth, are very convenient for the more speedy housing of Corn, for the better preserving of it, the more easie thrashing it out, the more convenient fothering of the Cattle with the Straw, and for the cheaper disposing of the Soil for the Improvement of the Land, as is practis'd in the Clay-Countries of *Suffex*, where their Gate-ways between their Inclosures are so miry (they having no Gravel to mend them with) that they cannot (except it be a dry
Sum-

Summer) Cart between one Field and another. For which reason a Farm of fifty Pound *per Annum*, hath commonly two, if not three Barns belonging to it; with as many Cow-yards to fother Cattle in adjoyning, to prevent carting of their Corn, Dung, Fodder, &c. whereas a great Barn cannot lie near to every part of a large Farm, and the Corn must be more exposed to the wet in a rainy Harvest.

*High
Winds.*

High Winds prove very pernicious and injurious to the Husbandman in several respects, to his Building, Fruit-trees, Hops, Corn, &c. as many in the plain open Countries find by woeful Experience; to prevent which, as to Building, we find by common Experience, that Trees are the only and most proper Safeguard; for which the Yew is the best, although it be long a growing; only 'tis to be observ'd, that the Trees should not be planted so near the Building, as that their fall may any ways endanger them.

Timber or other Trees which are also subject to be subverted, or broken by high Winds, to abate the largeness of their Heads by cutting off their spreading Arms a Yard or so from the Body, proves a good prevention, especially the Elm, which ought often to have its Boughs shred up, or else it will be very subject to be injured by high Winds.

Hops of any Plant the Husbandman propageth, receive the most Damage from high Winds, which may in some measure be prevented against the Spring-wind, which nips the young Buds, and afterward bloweth them from the Poles; a good Pale or Thorn-hedge much advantageth them. But against the borderous Winds when they are at the Tops of
the

the Poles, a tall Row of Trees incompassing the whole Hop-garden, is the best Security in our Power to give them. Be sure also to let their Poles be firm and deep in the Ground.

As to Corn, Winds sometimes prove an injury to it in the Ear, when they are accompanied with great Rains, by lodging of it. The only Remedy is to cut it betimes, and to let it lie long on the Gavel to kill the Weeds, and to harden the Grain, which will never grow nor receive Nourishment after the Stalks are broke, or much bow'd down to the Ground. But the greatest injury is to the Winter-Corn when it is young, the fierce bitter Blasts in Spring destroying whole Fields, which nothing is a preventer of but Inclosures.

Blites and Mill-news have been generally taken to be the same thing, which hath begotten much Error, and the ways and means used for the Prevention and Cure have miscarried through the Ignorance of the Disease. For,

Mildew is quite another thing from blasting, *Mill-dews* Mill-dews being caused, as some say, from the condensation of a fat and moist Exhalation in a hot and dry Summer, from the Blossoms and Vegetables of the Earth, and also from the Earth it self, which by the Coolness and Serenity of the Air is condensed into a fat glutinous Matter, and falls on the Earth again, part whereof rests on the Leaves of the Oak and other Trees, whose Leaves are smooth, and do not easily admit the Moisture into them, as the Elm or other rougher Leaves do. Mill-dews become the principal Food of the Bees, being sweet, and easily convertible into Honey.

Other

Other part thereof rests on the Ears and Stalks of Wheat, bespotting the Stalks with a different Colour from the natural, being of a glutinous Substance by the heat of the Sun, and so binds up the young, tender, close Ears of the Wheat, that it prevents the growth, and completing of the imperfect Grain therein, which occasioneth it to be very light in Harvest, and to yield a poor, lean Grain, for which reason many reckon the bearded Wheat not so subject to it, as the other, the Beards defending of the Ear from it.

Some think Mill-dews to proceed from Vapours arising from the Dung, and so falls upon the Corn; because Lands new dunged are the most subject to it.

But if after the Mill-dew falls a Shower succeeds, or the Wind blows stiffly, it washeth or shaketh it off, and these are the only natural Remedies against this Distemper.

Some advise in the Morning after the Mill-dew is fallen, and before the rising of the Sun, that two Men go at some convenient distance in the Furrows, holding a Cord stretched strait betwixt them, carrying of it so, that it may shake off the Dew from the Tops of the Corn, before the heat of the Sun has thicken'd it.

It is also advised to sow Wheat in open Grounds, where the Wind may the better shake off the Dew, this being look'd upon to be the only inconveniency Inclosures are subject unto; but it is evident that the Field-Lands are not exempted from Mill-dews, nor yet from Smut, where it is more than in inclosed Lands.

Some

Some say, that Lands that have been subject to Mill-dews many Years, have been cured by sowing of Soot with or just after the Corn.

'Tis observable, that after a wet Summer *Blites*, Corn is apt to be blited; the reason of which is, that the over-much Moisture that lies continually at the Roots of the Corn, maketh it run much to Straw, and little to Corn; and at such time as the Corn should kern, the moist Vapours exhaled by the Sun from the wet Ground, do in the Nature of a Mill-dew, prevent the due growth of the Grain in the Ear.

'Tis observ'd, that when these Mill-dews arise, or Blites fall, they infect one sort of Grain generally, as sometimes only Wheat, sometimes Oats, &c. the like happens among Fruits: sometimes Apples are generally blasted, sometimes only Pears, sometimes only Cherries, Walnuts, Filberts, Plumbs, &c.

Smuttiness in Corn happens from very different Causes to what Mill-dew and Blites do, it being chiefly to be found in dry Summers, and is occasion'd from too much Rankness and Fatness of the Land: It being observ'd, that strong Lands are to be sow'd with Hemp, Barley, Pease, and such like, to abate the Fertility thereof, before it be sown with Wheat, which would otherwise be subject to Smuttiness.

It is likewise confidently affirm'd, that the sowing of Wheat mix'd with smutty Corn, generally produces a smutty Crop, unless it be steeped in Brine all Night, and then mix'd in the Morning just before sowing, with Lime beat to Powder, which is esteemed a certain Remedy. Only you must observe, that what Corns are light and swim upon the top of the Brine, are to be scummed off.

You may also prepare your Ground with Lime, Soot, or other saline Manure, and it will produce Corn free from Smut. Dung alone is reckon'd a Cauſer of it, if 'tis laid on juſt before ſowing; and Land often ſown with the ſame Seed, or much out of heart, is ſubject to Smuttineſs, as hath been found by Experience, where the ſame and different Seed hath been ſown on two ſorts of Land.

I am told, that if you ſteep Wheat in Urine inſtead of Brine, it will prevent its being ſmuttery; or you may mix Urine and Brine together.

If you have ſmuttery Ears among your Corn, ſo as to black the reſt of your Corn, if you deſign it for Seed, pick out the black Ears: But if for Sale, you muſt take it and waſh it in two or three Waters, till you ſee all the blackneſs quite gone: Which done, drain away the Water clean, and laying the Corn on Cloths or Coverlids, lay it in the heat of the Sun, and ſo dry it again, till it be ſo hard that it will grind. But if the time of the Year will not ſerve for the Sun's drying of it, then dry it on a Kiln, with a very ſoft gentle Fire, and cool it in the Air to recover the Sweetneſs again, and the Corn will be as ſerviceable as any other, only for Seed it will by no means do; and therefore it concerns every Countryman to take heed that the Corn he buys for that uſe be not waſhed.

To know which from other Corn, you may take it up in your Hand, and if the Corn look bright, clear and ſhining, being all of one intire Colour, you may be ſure 'tis unwash'd: But if it look whiter at the ends than in any other part, and that the whiteness is blackish and

and not shining, you may conclude it to be washed Corn.

Again, put three or four Grains in your Mouth, and chew them, and if the Taste be sweet and pleasant, and grind mellow and gently between your Teeth, 'tis good. But if it have a bitterish raw Taste, and grind hard between your Teeth with much roughness, then hath the Corn been wash'd and dry'd again, and is not good for Seed: Also when Corn is more than ordinarily dry, both are ill Signs, and shew either imperfect Corn, or bad keeping: For good Corn always holds an indifferent Temperature betwixt dry and moist, and will always feel cool and slippery in the running of it. But some say that if Wheat be smutty or Mill dew'd, if in the thrashing of it you mix Barley-Chaff with it, it will cure it. If Corn is blasted, I am told that if you set it up in Ricks three or four Years, that the blasted Ears will consume and rot away. In *Northamptonshire*, if their Wheat grow in the Ear, they kiln-dry it, and make good Bread of it by mixing of it with Oat-flour and Leaven, which they keep two or three days before they eat.

There is much Land in *England* that is capable of very great Improvement, by removing of these common and stubborn Obstacles, as Stones, Shrubs, Bushes, Goss, Broom, &c. which are naturally produced in many places, and are a very great prejudice to Land, by sucking out the heart and fatness of it, or by occasioning a burning Drought upon it. As,

Stones, where they are too thick upon a hot burning gravelly Land, they are of good use to mend Ways with, or to pave with, being picked up and laid in heaps, and so carried

off. But there are some very cold chalky Clays upon the tops of bleak Hills much exposed to high Winds and nipping Frost, that the Stones are a Safeguard to the Corn that grows on them, by the keeping of the Roots of it warm in Winter, and sheltering of it by their shade in Summer, from the scorching heat of the Sun. Some of these sorts of Lands that the Stones have been carried off, would neither bear Corn nor Grass, till they were carried on again.

Shrubs and Bushes are very great Annoyances to the Husbandman, the difficulty and charges of pulling them up, being the principal Impediment of their Removal, to them that are ignorant of doing it the most dextrous ways. Where they are tall and grow thick, the quickest way of pulling them up, is to inclose in a Timber-Chain as many of them as you can, and to clap to them a Team of Horses, and so to tear them up: And when that parcel is eradicated, then encompass as many more. But if they are not big enough for this way, or grow too thin, the following Instrument is the



best for this purpose, and also for Furze, Broom, &c. At A is a long Handle of Wood about four Foot long, at B is an Iron Hook jagged, at C is a little Hook, which they use thus: They put the Handle A a slope from them, and catch the Stem or Stalk of the Broom or Bush they design to pull up in the Hook at B, and from that they bend the Stem to the little Hook

Hook at C, this occasions the holding of the Stem that it doth not slip, and so setting of their Shoulders to the upper End of the Handle at D as it stands sloping, they raise up the Bush or Broom; the price of doing of which, where a Man hath Fourteen-pence a day, is to pull up a load of Bushes or Broom which they reckon to contain sixty Faggots, is two Shillings, which Faggots being well bound ought to contain four Foot and a half in Circumference: But where the Bushes are short, and grow upon old Stubs, they must be stubbed with a Mattock, the price of which where the Bushes grow thick, is Three-pence a Pole square: But if you will have the Land dug up, that so you may be sure to clear the Land of the Roots, and to kill them, the common Price is Four-pence a Pole, the Owner of the Land having the Bushes and Roots.

Some Lands are much given to the bearing of Furze, especially such as are inclining to Sand. Which is destroyed either by plowing up, burning and mending of it well with Marle, Lime, Dung, &c. or by planting of Acorns among them, which the Furze will shelter and shade till they get up above them, and then the Oaks will destroy the Furze by dropping on them.

The young tender tops of Furze being a little bruised, and given to a lean sickly Horse, will strangely recover him and plump him up.

But the most pernicious Plant that grows upon Land is Broom, which, as it sheds no Leaves, so 'tis continually sucking the heart of the Land it grows upon. The only way to kill it is to pull it up, to plow the Land, and Burn-bate and manure it very well with Dung,

Ashes, &c. but the only effectual Remedy for it is Chalk, Marle or Urine. If you design the destroying it on Pasture Land, 'tis better to cut it up in *May*, when the Sap is in it; because by that means you kill the Roots: Whereas if you pull it up, you are apt to leave Strings behind, the least of which will grow.

Foddering of Cattle on broomy Land is good to destroy it, because of the Beasts Urine, and their treading of the Land makes it solid, it being observed, that near old Paths Broom seldom grows.

Broom, if well laid, will make an excellent Thatch for Houses or Barns.

Ling, Heath, &c. being much of the same Nature, I shall pass them by, because they are cured by the same Remedies; and only observe that Heath in many places being very necessary for Firing where other Fuel is not to be got, the cutting up of the Turf is a very good way to destroy it, especially if the Ashes be laid on the places where 'tis cut off, it being an extraordinary good Manure for Land. The Price of cutting of the Turf is 8d. a Load, five hundred of Turf being reckon'd to a Load.

Fern.

Next unto these Shrubs I think Fern one of the worst of Weeds, and 'tis as hard to destroy, where it has any thing of a deep Soil to root in. I have seen the Roots of it in some Grounds eight Foot deep. The best Cure is often mowing of it while in Grass, which should be done three times a Year in *May*, *August*, and the Spring following. If you plow it up, plentifully dunging of it and Ashes are very good: but the certainest Cure for it is Urine. Fern cut when the Sap is in it, and left

left to rot upon the Ground, is a very great Improver of Land; and will mellow it so as to prevent its binding. Trees also planted when it grows will thrive very much, though on a hot Gravel, the Fern shading of the Roots and keeping of them moist and cool. If burnt when so cut, their Ashes will yield double the quantity of Salt that any other Vegetable will do. In several places of the North they mow them green, and burning of them to Ashes, make the Ashes up into Balls with a little Water, which they dry in the Sun, and use them to wash their Linen with, for which use they esteem it near as good as Soap.

The often treading of them down and feeding of them with *Scotch* Sheep, I am told, is an infallible way to kill them.

Thistles are a great Annoyance to some *Thistles.* Land, by killing the Grass, Corn, &c. altho' they are a sure token of the strength of the Land. The way to destroy them is to cut them up by the Roots before seeding time, that they may not by their flying Seeds increase themselves: For if you cut them too young, it will make them but branch the more.

Rushes, Flags or Weeds, and such like *Aqua-Rushes.* ticks, are best destroyed by draining; if that you cut your Drains below the Roots thereof, that they may take away the Matter that feeds them, and by laying of Ashes or Soot on them, and also by ploughing of them up, and laying of the Land in high Ridges to drain it, and by mowing of them, which should be done very early while the Sap is in it; and if you make not the Hay too much, it will be the better for the Cattle.

Twitch-grass.

'Twitch-grass is a very pernicious Weed to some Land by keeping of it loose, hollow, and by drawing away the Virtue of the Ground, to the prejudice of the Corn sown upon it, it bespeaks the Land to be of a cold sowe Nature; the best Remedy is good fallowing in dry Weather, and harrowing it well, with good manuring of it with Lime, Dung, Ashes, Chalk, &c. White Oats are likewise a good Seed to sow on such Land, because they are sown late, and come up quick to over-top it. Burn-bating of this Land is an effectual way also of destroying it.

Goose-grass.

Goose-grass or Wild-tansie is a Weed that strong Clays are very subject to. The best Cure of which is mowing of it in Summer, and well-dunging of the Land, and never to plow the Land out of heart.

Green-weed or Wood-wax, if cut while green and made Hay of, Sheep will eat it in Winter. The best way to destroy it is good Plowing and good Dunging.

Garlick.

Garlick both yellow and white is very prejudicial to Corn, some Lands being very subject to it, especially if manured with Cow-dung alone, which increases it more than any other Manure, except it is mixed with Horse-dung or other hot Manure.

I am told, that one who sowed a Field with Barley had Garlick came up very thick in it, and when it was in flower ready to seed, which is commonly about the middle of May, he mowed it as low as he could, so as just to take off but some of the top of the Barley with it, and it killed the Garlick, and gave opportunity to the Barley to get above it; so that he had four Quarter of Barley upon an Acre.

Be

But where the Land is subject to Weeds that are increased by Seed, the best way is to lay it down some Years with Grass-feed and feed it.

Wild Oates in some Lands are very prejudicial to the Husbandman, and increase in wet *Wild Oates.* Years, and after much Frost. To prevent them some sow black Oates, which being ripe before the wild ones, are cut down before the others can fall or sow themselves; especially if the black are cut a little the earlier.

The sowing of Beans is also recommended to destroy them; because they may feed them with Sheep when they are about three Inches high, who will eat up the wild Oates and other Weeds, and not hurt the Beans. They put about twenty Sheep to an Acre; but they must be put in in dry Weather, and not kept in too long. Burning of the Stubble is also commended.

Some Lands are more prone and subject to Weeds, and that in some Years more than others: For the destroying of which in Corn-Lands, the laying of them dry and good fallowing is the best Remedy: but for Pasture-Land sometimes mowing is good. Soot and Ashes, especially upon cold Lands, or Lands run over with Moss, are an extraordinary Improvement.

The Fox is a Beast also very prejudicial to *Foxes.* the Husbandman by taking away and destroying of his Lambs, Poultry, Geese, &c. especially in places that are near Forest-woods and Covert-places. The best way for destroying of them is with Guns or Traps, after this manner; if you design to shoot them, procure a Sheep's Paunch, and tying of it to a long stick rub your Shooes well upon it, that the Fox may have no Scent of your Feet, and draw the
Paunch

Paunch after you, with which make a Trail a Mile or two in length; which order so as to bring it near some thick-headed Tree. At which place, when you have made your Trail, leave your Paunch, and with your Gun get up into the Tree; and as soon as it begins to be dark, you will see him come by you upon the scent of the Trail, where you may shoot him. Observe that you draw the Trail to windward of the Tree if you can.

But if you have a mind to catch them with a Steel Trap, which is the surest way; chuse a place to set it in a plain part of a large Field; let it be out of the way of all Paths, but not near either a Hedge or any shelter. Open your Trap, and lay it upon the Ground, and cut out in the Turf just the form thereof, and take out so much Earth as may make Room to lay it, covering of it again very neatly with the Turf you cut out; and because the joints of the Turf will not close exactly, get some of the fine Mould that is to be found in a new cast up Mole-hill, and fill the joints with it, taking some Grass, and sticking of it in the Mould, as if it grew there. Make all so fine and plain as that it may deceive your own Eye to look upon it. About eight or ten Yards from the Trap three several ways, scatter some of the fine Mould that you had out of the Mole-hill, very thin, upon a place about fourteen or fifteen Inches square; and upon these places, and where the Trap is, lay two or three small bits of Cheese, and with a Sheep's Paunch, as is before directed, draw a Trail of about a Mile long to each of the three places, that are at a distance from the Trap, and from thence to the Trap, that so the Fox may come upon
one

one of those places first, which will make him approach the Trap with the more boldness, where you will seldom fail of him, only you must observe not to fasten your Trap, but to leave it loose, that he may draw it to the Hedge-side, or to some Covert, or else he will bite off his Leg and be gone.

Some bend down a Stick in the Wood, and set a Trap for them in their Paths, like that which is set for Wood-cocks, which hangs them up, or any other sort of Vermin.

Badgers are almost as pernicious a Beast as *Badgers.* the Fox, only they are not so subtil, nor can they so easily catch their Prey: but for what they can catch, as new fallen Lambs, young Pigs, and Poultry, they are as bad. The way to catch them is with the aforementioned Trap, or to set a Steel-trap, or to dig a Pit in their Path that is five Foot deep, and about four Foot long, making of it narrow at the top and bottom, and wide in the middle. This must be covered with some small Sticks and Leaves laid over it, so as that the Badger may fall in when he comes upon it. Sometimes a Fox may be caught in one of these Pits; but 'tis very rare; for he is very cautious of his Footing. Some hunt them into their Holes in a Moon-shine Night, and dig them out.

Otters are very great destroyers of Fish, e- *Otters.* specially in Ponds, to which they will in a Night travel over Land ten or twelve Miles; their common aboad is under the Root or Stem of some Tree near the Water. Whence she expects her Food by her diving and hunting under Water: so that few Fish are able to escape her. They are either taken by snaring them under the Water by the River-side; or by

by hunting of them with Dogs, where you may make use of the Spear.

In several places the Husbandman suffers much by Hares and Coneys, which eat the Corn, Trees, &c. when they are young, especially in hard Winters.

Hares.

The Hares are great destroyers of Corn, where there are many of them: The Countryman may lessen the Number of them as he sees cause, either by hunting or coursing of them at seasonable times, or by tracing them in the Snow.

Coneys.

Coneys are destroy'd or taken either by Ferrets or Purse-nets in their Burrows, or by Hayes, Curs, Spaniels or Tumblers bred up for that purpose, or by Gins, Pit-falls or Snares.

Poll-cats, Weefels and Stoats do a great deal of injury to Warrens, Dove-houses, Hen-roosts, &c. but the way of taking them in Hutches, Iron-traps, &c. are so well known, that I need not say any thing of it.

Poll-cats.

To prevent Poll-cats or such like from destroying your Pigeon-house, if you have a conveniency, place it in an Island where you may have some Ditch or Channel of Water round it, and it will preserve it from Vermin; there being scarce any Beast of Prey that will take the Water.

Moles.

Moles are a very pernicious Enemy to Husbandry, by loosening of the Earth, and destroying the Roots of Corn, Grass, Herbs, Flowers.

In the Southern parts of *England* their usual way of destroying of them is by Traps that fall on them, and strike sharp Tines or Teeth through them; which are so common, that they need no Description.

The

The best sort of Trap is made after this Fashion. Take a small board of about three Inches and a half broad, and five Inches long on one side thereof ; raise two small round Hoops or Arches, one at each end, like unto the two end Hoops or Bails of a Carrier's Waggon, capacious enough for a Mole to creep through easily ; in the middle of the Board make a Hole about the bigness of a Goose-quill for to put into which have a short Stick about two Inches and a half long ; one end of which must be fitted to the said Hole ; and the other a little forked. Also you must cut a Hazle or other Stick about a Yard or a Yard and a half long, that being stuck into the Ground, may spring up. Then make a link of Horse-hair very strong, and that will easily slip, and fasten it to the end of the Stick that springs. Have also in readiness four small hooked Sticks, and go to the Furrow or Passage of the Mole, and after you have open'd it, fit in the little Board with the bended Hoops downward, so that the Mole when she passes that way, may go directly thro' the two semicircular Hoops. But before you fix the Board downward, put the Hair-string through the hole in the middle of the Board, and place it round, that it may answer to the two Hoops, and with the small Stick (gently put into the hole to stop the knot of the Hair-spring, but not enter'd too far into the hole) place it in the Earth in the Moles passage, and by thrusting in the four hooked Sticks, fasten it, and cover it with Earth ; and when the Mole passes that way, (either the one way or the other) by displacing or removing of the small Stick that hangs perpendicularly downwards,

the

the knot passing through the hole, the Spring takes the Mole about the Neck.

Others destroy them with a Spaddle, waiting in the Mornings and Evenings for them; at which times they usually stir, and immediately cast them up, especially about *March*, when they breed, by turning up the Hills that they breed under, they usually making their Nests in the greater Hills, which are easily discern'd. Then also will the old ones come to seek their young, which you may presently take.

The Pot-trap is by some much commended, which is a deep Earthen Vessel set in the ground with the brim even with the bottom of the Mole-tracts; the chief time of setting of which is in their Bucking-time, which is in *March*.

Also where Moles annoy your Gardens, Meadows, or such places as you are not willing to dig, or break much, the fuming of the holes with Brimstone, Garlick, or other unsavory things, will drive them out of the Ground that was before infested with them; and the putting of a dead Mole into a common haunt, will make them absolutely to forsake it. But to destroy them I am told that if you take white Hellebore and the Roots of Palma Christi, and dry and powder them, and pass it through a fine Sive, adding to it Barley-meal and Eggs diluted with Wine and Milk, of which make a Paste, and divide it into little Pellets, which lay under the Mole-hills, and it will kill them.

Chap. II. Of Mice and Rats.

Every one is sensible of the great Injuries *Mice and Rats.* these Vermin do both in the Field, and where they raise Nurseries of Trees in their Gardens, where they sow and plant Beans, Pease, &c. and in their Houses, Barns and Corn-ricks.

In the Fields, Orchard, Gardens, &c. the common way of catching of them is by placing of an Earthen-pot in the Ground about half full of Water, which they cover with a Board with a hole in the middle thereof, and cover the Board with Hawn, Straw, or such like Rubbish, under which the Mice seeking for shelter, creep into the Holes, where they find the Pot ready to receive them.

Some place three Sticks in the form of a Figure of 4, which they bait with a piece of Cheese, and upon it lay a Tile, which falling down when they touch it, kills them; this is a very good Trap for to catch them with in Gardens and Orchards, and such like places.

In *Staffordshire* they put Birdlime round the holes, which the Mice and Rats run through in their Houses, Barns, &c. which, they say, sticks to their Skins, that they will never leave scratching till they kill themselves.

Some strew Sand amongst their Corn, which, they say, prevents their burrowing in it; because of its falling into their Ears.

As for the making of Stavals, Granaries, Barns, &c. that the Mice and Rats cannot come at the Corn that is in them, I have already given you Directions.

Chap.

Chap. III. Of Kites, Hawks, &c.*Kites, &c.*

Kites, Hawks, and other Birds of Prey, wait for Pigeons, Chickens, Pheasants, &c. for which reason 'tis necessary that the Countryman be constantly provided with a good Fowling-piece to destroy and scare them away.

Also you may place small Iron-gins about the breadth of ones hand, made like a Fox-gin, and baited with raw Flesh, which is a very good way to catch them.

Also by straining of Lines or pieces of Nets over the places where you keep Chickens, Pheasants, or such like, you may fright them away.

Crows, &c.

Crows, Ravens, Rooks and Magpies are great annoyances to Corn, both at Seed-time, pulling of it up by the Roots whilst it is young, and feeding on it also at Harvest: A good Fowling-piece is the best Instrument at present; but the only way to destroy the kind of them would be some publick Law to encourage the destruction of their Nests and Young, which are so obvious at their Building-time, that it seems to be a very easie Work, and much better than any other way.

Several Inventions of Scare-crows there are to keep them from Corn, amongst which this is esteemed the most effectual, *viz.* To dig a hole in some obvious place where the Crows, &c. annoy your Corn; let it be about a Foot deep or more, and near two Foot over, and stick long black Feathers of a Crow or other Fowl round the edges thereof, and some at the bottom: Several of these holes may be made, if your Ground be large; and where these holes

an

are thus dressed, the Crows will not dare to feed.

Dead Crows, &c. hanged up do much terrifie them ; but amongst Cherry-trees and other Fruit-trees, which are much prejudiced by them, draw a Packthread or small Line from Tree to Tree, and fasten here and there a black Feather, and it is sufficient.

Pigeons are a very pernicious Fowl to the Publick, and bring but little Profit to the Owners (that I could ever find) where they must be fed in Winter and at Benting-time, which you must do in all places, except the Clay-Countries, where they sow great quantities of Gray-pease and Horse-beans, which are sow'd forward in the Year, as I shew'd before.

The only way to get rid of them is to affright them with shooting Powder at them, and to hang up Feathers in Lines as was before directed for Crows and other Birds.

Jays are great devourers of Beans, Pease, Cherries, and other Garden-Fruits ; but are easily met withal, if you are watchful in a Morning early, by lying in Ambush for them, sometimes changing your place, lest they discover you ; but if they do, they commonly make but short Flights as it were from Tree to Tree, so that you may easily pursue them where you have any thing of shelter to get behind.

A very good way to take them is to drive a Stake into the Ground about four Foot high above the Surface of the Earth ; let the Stake be made picked at the top, that the Jay may not settle on it, and within a Foot or thereabouts of the top of the Stake, bore a hole through about three quarters of an Inch Diameter, fit a Pin or Stick to the hole about six

or eight Inches long, and make a Loop or Spring of Horfe-hair fastned to a Stick or Wand of Hazel that may be entred into the Stake at a hole near the Ground, and by bending of the Stick up put the Loop of Horfe-hair through the upper hole, and put the short Stick a little way into the hole, and lay the Loop round on the short Stick, that the Jay when he comes may find this resting place to stand conveniently amongst his Food, so as that when he perches on the short Stick he may by his weight cause it to fall, which will give the Spring the Advantage of catching the Jay by the Legs. This is a very good way of taking of them, if 'tis placed amongst Beans, Pease, or such things as the Jay haunts, it being their usual Custom to hop from Tree to Tree, or any thing they can meet withall.

Bulfinches. *Bulfinches* are most pernicious Birds to young Fruit-Trees, by feeding on the young pregnant Buds in Spring time which contain the Blossoms, and are the only hope of the succeeding Year.

If *January* prove very cold, that the Black-thorns are backward in *February*, the *Bulfinches* will be very busie in the Garden. The Trees there growing being forwarder than in the Field in a cold Winter. I have known so many of them in a Garden, that in a little time they have almost totally unbudded the Plumb-trees, Currant-trees, &c. of a whole Town.

They are easily taking off with a Fowling-piece, only you must be cautious that your Shot spoil not your young Layers or Branches of your Trees.

This Bird is so bold that no Scare-crow or other thing will frighten him from the Trees he delights

delights to feed on ; but on the *Morocco Plumb* or the *Damascen*, he will settle and feed, notwithstanding all you can do : so that the best way to preserve these Buds, is to Birdlime the Twigs.

Goldfinches are very injurious to the Goose-^{*Goldfinches*} berry Buds, coming in Flights, and cleansing a whole Garden of them immediately ; as the *Bulfinches* will the Buds of the *Currant-trees* : The remedies against them are the same with the other.

The *Chaffinch*, *Greenfinch*, *Titmouse*, and other ^{*Chaffinches*} small Birds are injurious to some Fruits ; but not like those beforementioned, who will prey upon the Buds of all Sorts of Fruit-trees, under the very Nets that cover the Trees, and near unto the dead Bodies that hang on them.

Sparrows, although they are but small, yet ^{*Sparrows*} are they a numerous Generation of *Corn-eaters* : It is unknown how much they devour, and what a great damage they are to the Husbandman, especially in scarce and dear Years.

Many ways are made use of to destroy them, but none more effectual than the large folding Sparrow Net, which will take many dozens at a draught : They being so easily induced to come to a scrap or place baited for them, especially in hard Weather in the Winter, and in the Summer before the Corn is ready for them : At both which times meat is scarce abroad, and then they flock to Barns. To prevent Birds eating of new sown Corn, sow Lime or Soot upon it.

Moist and warm Lands, which are usually ^{*Frogs*} the most fertil, are most subject to these Vermin : *Frogs* are best destroyed and prevented in

February in the Ditches where they Spawn, by destroying of both Frogs and Spawn. *Toads* are easily destroyed in Summer Evening (by a Candle) creeping up and down the Walks and Passages about your House and Gardens, &c.

Snails.

To Wall-fruit and several Sorts of Garden-plants, there cannot be a worse enemy than *Snails*, which you may in a dewy Morning easily find where they most delight to breed; but the surest way is in the hard Winter to seek out their haunts, and to make a clean riddance of them: They lie much in the holes of Walls, behind old Trees, under Thorns or other old and close Hedges, &c. or as they couple from Spring to Midsummer and after, and lay their Eggs in the Ground, so you may easily find them with their Bodies buried and only their Shells above Ground, and so destroy them and their Eggs too, or if you scatter Lime or Ashes on the Rills, it will destroy them, and also all sorts of Weeds, Worms, or other Insects.

Ever observe not to pluck of such Fruit as the Snails have begun to feed on, but let it remain: for they will make an end of that, before they begin any more.

The best way to take Snails, is to set Tyles, Bricks, or Boards hollow against a Wall, Pails, &c. So as that the Snails may seek shelter under them. About *Michaelmas* the Snails secure themselves in such places for the whole Winter, unless you prevent them by taking of them in *December*, and destroying of them, which is an easie and sure way to rid your Garden of them.

Worms are very prejudicial to Land by eating *Worms.* the Roots both of Corn and Grass, especially when the Corn begins first to shoot.

The best thing to destroy them is any thing of Salt; and therefore I believe that Sea-water would be a very great Improvement of Lands near the Sea that are troubled with them.

I had once a piece of very rank Clay Land that was very full of Worms upon which I sowed Soot, which killed several Buttels of them: But I have try'd Soot upon other Clay Lands, and other Sorts of Lands too, without finding of the same effect; whether it was because of the difference of the Soil, or the time of the Year that I did it in, or whether it was because the other Land was sooted before, I could never yet find.

Some commend Chalk and Lime as very good to destroy them. The Winter fallowing of Land in a wet time when the Worms come upon the top of the Ground, is very good also to kill them, especially if you drive some Nails with sharp heads into the bottom and sides of your Plow which will cut them to pieces.

If they are prejudicial in your Garden, water your Beds or Walks, with the Brine that you salted your Meat in, or with a strong Lixivium made of Ashes, or if you fill a Cistern or Trough with Water, and put into it a large quantity of Walnut Leaves, and let them steep a Fortnight or Three weeks, till the Water is very bitter and it will kill them.

Or you may lay Ashes or Lime about any Plant you desire to preserve from Snails or Worms, and they will not come near it; because the hot biting nature thereof hurts their tender Bodies; only as the Rain or Moisture weakens

the Ashes or Lime, you must renew it. Where Land is subject to Worms, sow your Seed as shallow as you can.

Gnats and Flies.

Gnats and *Flies* are very troublesome in Houses, especially such as are situated near watery places, and do mischief in the Fields by eating the Leaves of several things, as they come up first, especially Turneps, so as sometimes to destroy whole Fields.

To keep your Houses clear of them, keep your Chamber Windows close in Summer time, especially towards Evening, and Smoak your Rooms well with Brimstone, or burn Straw in them, which will cause them to fly into the Flame, and be consum'd, or else the Smoak will choak them.

Ashen-Leaves hanged up in the Room will attract them unto 'em that you will be less troubled with them.

Balls made of Horse-dung and laid in a Room will do the same if they are new made; by which means you may whelm some things over them and keep them there.

Wasps and Hornets.

Wasps and *Hornets* usually prove very injurious to some Sorts of Fruit, to Bees, &c. and are several ways destroyed.

First, By way of prevention, that is the Spring or Summer before they have increased, to destroy the old ones: For from a few they do increase to a Multitude.

Or you may smoke or stifle them if they are in a hollow Tree, or scald them if in the Thatch of an House or Barn, &c. or in the Ground you may either scald or burn them, or stamp in the Earth upon them, and bury them.

To destroy such as come to the Fruit, Bees, &c. set by them Cyder, Verjuice, sowre Drink, or Grounds, in a short neck'd Vial, wherewith you may catch many.

Also you may lay sweet Apples, Pears, Beast Livers, or other Flesh, or any thing that they love, in several Places; upon which you shall have some times as many as will cover the Bait, which you may kill at once.

Catterpillars destroy the Leaves of Trees in *Catterpil-* Summer, devour Cabbages and other Garden *lars.* Tillage, and are generally the Effect of great Droughts.

To prevent their numerous Increase on Trees gather them off in Winter, taking away the Prickets which cleave to the Branches, and burn them: But if they get on Colliflowers or Cabbages, take some Salt-water and water them with it, and it will kill them, or take some of the Catterpillars themselves and Garlick; bruise, and infuse them in Water, or you may Smoak them with dry wisps of Straw in *March*, just as the Bud begins to open.

I had one Year the leaves of my Trees, quite eaten off, in a young Orchard: and I set some Women to pick them off, and had hardly any in my Trees the next Year.

In the Summer while they're yet young, when either through the coldness of the Night, or some Humidity, they are assembled together on heaps, you may take them and destroy them, or you may wash your Trees with Water, in which Wormwood, Tobacco stalks and Coloquintida has been boyled, or take Lime-duft, and when the Wind is high, and the Trees wet, sprinkle the Duff, so that the Wind may blow it on the Trees.

Earwigs.

Earwigs in some Years prove iniurious to Fruits by the greatness of their Numbers, feeding on and devouring them.

They are destroyed by placing Hoofs or Horns of Beasts amongst your Trees and Wall-fruit, into which they will resort. Early in the Morning you must take them gently but speedily off, and shake them into a Vessel of Water.

Lice.

By reason of great Droughts many Sorts of Trees and Plants are subject to *Lice*; and seeing they are caused by Heat and Drought, as is evident in the Sweet-bryar and Gooseberry that are only lousie in dry Times or in very hot and dry Places, therefore frequent washing them by dashing Water on them may prove the best remedy.

Ants.

Ants or *Pismires*, are injurious to a Garden, and also to Pasture-Lands, as well by feeding on Fruit, as by calting up of Hills, &c.

In the hotter Regions these Creatures are reckoned amongst the Pests of the Field, as in *Italy*, *Spain*, and also in the *West Indies*; yet are they commended as the Emblem of Knowledge and Industry, and were used by the *Egyptians* as the Hieroglyphick of Knowledge, every one of them laying up his own Store for the Winter, never robbing their Fellows, altho' they want themselves.

To keep them from Trees, compass the Stem four Fingers breadth with a Circle or Roll of Wooll newly pluck'd from a Sheep's Belly, or lay Saw-dust round the Tree.

Or to anoint the Tree with Tar will do the same; but as Tar is prejudicial to Trees, I should rather prefer Man's Ordure, which I be-

Lieve

lieve will do beyond the other ; because if any of it be put into their Hills it will kill them.

Also you may have Boxes of Cards or Past-board pierced full of holes with a Bodkin, into which Boxes put the Powder of Arsenick mingled with a little Honey : Hang these Boxes on the Trees, and they will certainly destroy them. Make not the Holes so large that a Bee may enter, lest it destroy them too.

Also you may hang a Glass-bottle in the Tree with a little Honey and Water in it, or moisten'd with any sweet Liquor, and it will attract the Ants, which you may stop and Wash out with hot Water, and prepare it again as above.

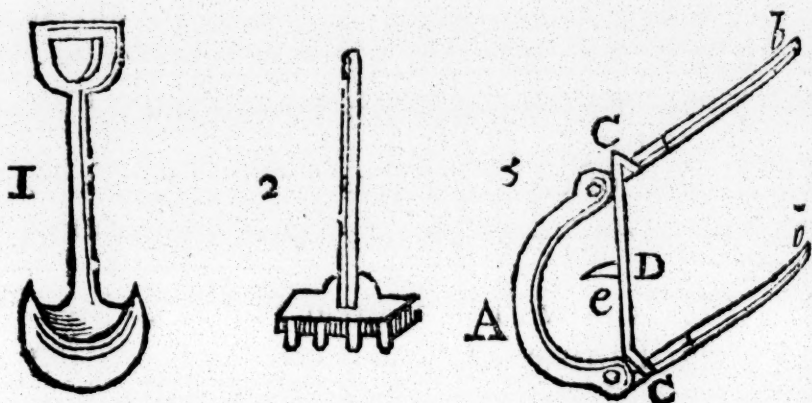
Watering often of Alleys or green Walks will drive away or destroy the Ants that annoy them.

Ant-Hills prove a very great Injury to Meadows and Pasture-Land, not only by wasting of so much Land as they cover ; but by hindring the Scythe, and yielding a poor hungry Food pernicious to Cattle.

To destroy their Hills, cut them into three or four Parts, beginning at the Top, and open the Hills so as to dig out the Cores below the Surface so deep, that when you lay down the Turf in their Places, they may lie lower than the other Ground, to the End that the Water may stand in it to prevent the Ants from returning, which they will else certainly do: Then spread the Earth you take out thinly abroad. The proper Season for the doing of which is in Winter, and if the Places be left open a certain time, the Rain and Frost coming on it will help to destroy the rest of the Ants :
But

But be fure to cover them up time enough that the Rain may settle the Turf before the Spring: The Price of doing of which, where a Man hath Fourteen-pence a Day, is Five-pence per Hundred.

In *Hertfordshire* they have a particular Sort of Spade which by reason of the sharpness of its Edges is very convenient for this Use: Its shape you have at Figure 1. and at Fig. 2. is an



Instrument much used in the West Country for the spreading of Mole-casts, the Teeth of which being Iron and broad, rakes out the Mould and spreads it; and at the other side where there is a kind of heel or knob, 'tis very convenient to break Clots with; but where there are great Quantities of Hills, and that you have a mind to make a quick Riddance of them, you may make use of the Engine at Figure 3. which at A hath a sharp Iron about three Foot over with a strong Back, 'tis about four or five Inches broad; at *bb* are two Handles to hold it by; at *CC* are two Loops or Holes to fasten the Horse Traces to that draws it; at *D* is a cross Bar of Iron to strengthen it, from which at *e* is a small Piece of

of Iron like a Plough-share to cut the Mole-Hill into two; or you may have two of the same Pieces of Iron which well divide the Mole-Hills into four Parts. With this Instrument, having one Horse to draw it, a Boy to drive and a Man to hold it, you may cut as many Hills in a Day, as eight Men can do the common way; only as it cuts the Hills up by the Roots, so it leaves a bare Place under them which is some prejudice to the Land, but that may be sown with Hay-feed, Clover, &c. and it will quickly have grass on it. The Convenience of which Instrument if it would engage People to the clearing of their Land of so great a piece of ill Husbandry, as many in several Parts of *England* are guilty of, by letting of their Land be run all over by these Hills, it would I think be of very great use to the Publick: But many forbear to destroy them upon a supposition that they gain Ground by them, which is a very great Mistake: For suppose a Hill whose Basis or Diameter is twenty Foot, and that the Ascent of the said Hill is fifteen Foot, and the Descent fifteen more, which makes thirty Foot: Now every body will own that the Diameter of the Hill which is twenty Foot may be pailed in with twenty Deals of a Foot-broad, and the same Number of Deals will inclose the Ascent and Descent of the Hill also, because the Boards stand perpendicular upon the sides of the Hill; and therefore Grass and Corn both growing upright, I do not think that any Land is gain'd either by Hills, or by the raising of Ridges.

B O O K VIII.

Chap. I. *Of the general Uses of Corn, Grain, Pulse, and other Seeds propagated by the Plough.**Wheat.*

WHEAT is the most general Grain used in *England* for Bread: Altho' it's not unfit for most of the Uses the other Grains are fit for ; as for Beer, a proportion of which being added to the Malt, helps much the keeping of it: If a little Wheat-bran is boiled in our ordinary Beer, it will cause it to mantle or flower in the Cup when it is poured out ; which sheweth with what a rich Spirit Wheat is endow'd, that so much remains in the Bran. If Wheat be malted, and a small Quantity added to other Malt, it will add much to the strength of your Beer ; but it's something more fulsome, being reputed to be a principal Ingredient in the making of Mum. Starch also is made of musty, unwholsome Wheat, and of the Bran thereof, than which there are few things whiter.

It may not here be improper for the baking of Bread to insert an Oven, which a Friend of mine has made, at the farther end of which he has made a vent for the Smoak, which if he had carried upright, would have obliged him to have been at the charge of a particular Funnel for it, besides he could not have well come at it to stop it, when the Oven was hot, and therefore he brought it with a Pipe over the Top of the Oven, by which means he can stop

stop both the mouth and vent together. He tells me, that the Air drawing through the Oven, his Wood kindles presently, and that any green wood will burn in it. He says it takes up but one third part of the Wood, that another sort of an Oven takes up to heat it; also Brick Ovens heat much sooner and better than those made with Stone.

The principal Use of *Barly* is for the making of Beer, being the sweetest and most pleasant Grain for that purpose: It is one of the best Grains for the fattening of Swine, being either boiled 'till it be ready to burst, with no more Water than it drinks up, or ground in a Mill, and wet into Past, or made into a Mash, either way it produces excellent Bacon. *Barly.*

Malt being an excellent Merchandize, and a *Malt.* Commodity of great Profit to the Husbandman, and the making of good Beer depending much upon it (besides the well brewing of it, which I shall defer the treating of, 'till I come to give an Account of *English Liquors*;) I think it may be of use to the Farmer to know when his Malt is well made, if he doth not make it himself: And likewise for the Improvement of our *English Liquors*, to consider some of the several ways of making of Malt; in order to which I shall,

First, Begin with the common way of making of Malt, as describ'd by Mr. *Markham*.

Secondly, The way of making of Malt in *Derbyshire*, according to the Description given in Mr. *Houghton's* Papers, and likewise transcribe the Account given by Sir *Robert Murray* in the Transactions of the Royal Society, of the way of making of Malt in *Scotland*, together with some other particular Observations that,

that I think may be of Advantage to the Maltster and Farmer.

To begin with the Art of making (or, as some term it, melting) of Malt, according to Mr. *Markham's* way; you must first (having proportion'd the Quantity you mean to steep, which should ever be answerable to the Content of your Cistern, and your Cisterns to your Floors,) let it run down from the upper Granary into your Cistern, or otherwise be carry'd into your Cistern, as you shall please or your occasions require. This Barly should by all means be very clean, and when your Cistern is filled, you should from your Pump or Well convey the Water into the Cistern 'till all the Corn be drenched, and that the Water float above it; if there be any Corn that will not sink, you should stir it about and wet it; and so let rest and cover the Cistern; and thus for the space of three Nights you should let the Corn steep in the Water. After three Nights are expired, the next Morning pluck out the Bung-stick or Plug, which stoppeth the Hole in the Bottom of the Cistern, and so drain the Water clean from the Corn, and save the Water: For much light Corn and other things will come forth with it, which is very good Swines-meat: Then having drained it, let the Cistern drop all that Day, and in the Evening with your Shovel empty the Corn from the Cistern into the Malt-floor; and when all is out and the Cistern cleansed lay all the wet Corn on a great heap round, or long, and flat on the Top, and the thickness of this heap must be answerable to the season of the Year; for if the Weather be extreme cold, then the heap shall be made very thick, as three or four Foot or
more,

more, according to the Quantity of the Grain: But if the Weather be temperate and warm, then shall the heap be made thinner, as two Foot, one Foot and an half, or one Foot; this heap is called by Maltsters a Couch or Bed of raw Malt.

In this Couch let the Corn lie three Nights more without stirring; and then if you find that it beginneth but to sprout (which is called coming of Malt) tho' it be never so little, as but the very white End of the Sprout peeping out (so it be in the outward part of the heap or couch) then break it open, and in the midst where the Corn lay nearest you will find the Sprout or Come of a greater largeness, then with your Shovel turn over all the outward part of the Couch inward, and the inward outward, and make it at least three or four times as big as it was at first, and so let it be all that Day and Night; and the next Day with your Shovel turn the whole heap over again, increasing the largeness, and making it of one indifferent thickness over all the Floor, not above a handful thick, at the most, not failing after for the space of fourteen Days (which doth make up in all, full three weeks) to turn it all over twice or thrice a Day, according to the Season of the Weather; for if it be warm, the Malt must be turn'd oftner; if cool then it may lie looser, thicker and longer together; and when the three Weeks are fully accomplished; then (having bedded your Kiln, and spread a clean Hair-cloth thereon) lay the Malt as thin as may be, as about three Fingers thickness (on the Hair-cloth) and so dry it with a gentle and soft Fire, ever and anon turning the Malt (as it drieth on the
Kiln)

Kiln) over and over with your hand 'till you find it sufficiently well dried; which you may know both by the Taste when you bite it in your Mouth, and also by the falling off of the Come or Sprout, when it is thoroughly dried. Now as soon as you see the Come begin to shed, you must in the turning of the Malt rub it betwixt your hands, and scowre it to make the Come fall away; then finding it all sufficiently dried; first put out your Fire, and let your Malt cool upon the Kiln for four or five Hours, and after the raising up the four Corners of the Hair-cloth, and gathering together the Malt on a heap, empty it with the Come and all into your Garners, and there let it lie (if you have not present occasion for it) for a Month or two to ripen, but no longer. For as the Come or Dust of the Kiln for such a space melloweth and ripeneth the Malt, making it both better for Sale or Expence: So to lie too long in it doth ingender Weevels, Worms and Vermin, which destroy the Grain.

Now for the dressing and cleansing of Malt you must first winnow it with a good Wind either from the Air or Fann, and before the winnowing you must rub it well between your Hands to get the Come or Sprouting clean away: For the Beauty and Goodness of Malt is when it is most smug, clean, bright, and likest to Barly in the View; for then there is least waste, and greatest Profit: For Come and Dust drinketh up the Liquor, and gives an Ill-taste to the Drink. After it is well rubbed and winnowed, you must then Ree it over in a fine Sieve, and if any of the Malt be uncleansed, then rub it again into the Sieve 'till it be pure, and the rubbings will arise on the Top of the Sieve,

Siev
and
Du
goo
Swi
eith
fed

Cha

F
for
that
of d
Floo
and

Fi
whit
the f

whic
great
it do
as th
serve
and
Subst
than

M
shew
he co
on th
yet t
can n
fectio
VO

Sieve, which you may cast off at pleasure; and both those rubbings, the Chaff and the Dust which come from the Winnowings are very good Swine's-meat, mixt either with Whey or Swillings. And thus after the Malt is ree'd either put it up in Sacks, or into a well cleaned Garner.

Chap. II. *Certain Observations of Mr. Markham's about the Making of Malt.*

F*irst*, He says there is a difference in Men's Opinions, as touching the constant time, for the mellowing and making of the Malt, that is, from the first steeping until the time of drying; for some will allow both Fat and Floor hardly a Fortnight, some a Fortnight and two or three Days, for these reasons:

First, They say it makes the Corn look whiter and brighter, and gets not so much of the sullyng and foulness of the Floor, as that which lieth three Weeks, which makes it a great deal more beautiful and saleable: Next it doth not Come or Shoot out so much Sprout as that which lieth a longer time, and so preserveth more heart in the Grain, makes it bold and fuller, and so consequently more full of Substance, and able to make more of a little, than the other of much more.

Mr. *Markham* says, these reasons are good in shew, but not in substantial truth; for altho' he confesseth that Corn which lieth least time on the Floor, must be the whitest and brightest; yet that which wanteth any of the due time, can neither ripen, mellow or come to true perfection, in less than three Weeks, cannot ri-

pen Barly; for what time it hath to swell and sprout, it must have full that time to flourish, and as much time to decay. Now in less than a Week it cannot do the first, and so in a Week the second, and in another Week the third; so that in less than three Weeks a Man cannot perfectly Malt. Again, he confesses that Malt which hath the least Come must have the greatest Kernel, and so be most substantial; yet the Malt which putteth not out his full Sprout, but hath that Moisture (with too much heart) driven in which should be expelled, can never be Malt of any lasting, because it hath so much moist Substance, as makes it both apt to corrupt and breed Worms. It is true, that this hast-made Malt is fairest to the Eye; and being spent as soon as bought, little or no loss is to be perceiv'd; yet if it be kept three or four Months longer (unless the place where it is kept be like a Hot-house) it will so give again, that it will be little better than raw Malt, and so good for no Service without a second drying.

Besides, Malt that is not suffer'd to sprout to the full kindly, but is stopped as soon as it begins to peep, much of that Malt cannot come at all; for the moistest Grains do sprout first, and the hardest are longer in breaking the Husk: Now if you stop the Grain on the first Sprouts, and do not give all leisure to come one after another, you will have half Malt and half Barly.

Next, there ought great Care to be taken in the well turning of Malt, or else some will Come too much, and some too little: And likewise in the Coming or Sprouting of Malt, which as it must not Come too little, so it must not Come

Co
me
neg
and
wh
and
spir
fore
in o
inw
ind
you
mix
can
the
fore
first
and
sepa
ther
othe
Mal
faul
son,
ver
Ec.
pres
unch

Cha

of
H
7

T

Come too much, and that which is called coined or sprouted too much, is when either by negligence for want of looking to the Couch, and not opening of it; or for want of turning when the Malt is spread on the Floor, it Comes and Sprouts at both Ends, which is called *Acro-spired*, and is fit only for Swine; and therefore you must be sure to have an especial Care in ordering the Couch, to heap the hardest Grain inward and warmest to make it all come very indifferently together. And if it happens that your Barly is some old and some new Corn mixed together, you may be assured this Grain can never sprout equally together, by reason the one exceedeth the other in Moisture: Therefore in this Case you must observe which Comes first, which will be in the heart of the Couch, and with your hand gather it by it self into a separate place, and then heap the other together again, and so continue to do 'till all the other is sprouted. And observe that if your Malt be hard to come or sprout, and that the fault consists more in the Coldness of the Season, than any defect of the Corn, you may cover the Couch over with thick woollen Cloths, &c. the warmth whereof will make it Come presently; which once perceived, forthwith uncloath it.

Chap. III. *An Account of the way of making of Malt at Derby, as describ'd in Mr. Houghton's Letters of Husbandry and Trade.*

Sprat, or Long-ear, so called from the length of it; or Battle-door Barly, from the flatness of the Ear. Each of these is a like good for making Malt. In choosing of Barley, for this use you must look that it be bold, dry, sweet, of a fair Colour, thin skin, clean faltered from Hains, and dressed from foulness, Seeds, and Oats. Any one that is accustomed to it by barely handling the Corn in the Sack will easily perceive whether it be bold, dry and well dressed or not; the Colour and Fashion of it will enable you to judge whether the Husk be thick or thin; the sweetness is found by the Smell: For some will appear fair to the Eye, which by the smell we may find to have receiv'd such hurt in the Mow as renders it unfit for Malting. If the Grains be of a dark Colour, and many Corns have brown ends, we may judge them to have been heated in the Mow, and they seldom come well in the Couch.

Having put what quantity of Barly we think fit into Cisterns, we cover it with Water, esteeming that drawn from the Brook, by reason of its fatness, much better than that from the Spring: In this we let it steep, till crushing the Corn, set end-ways betwixt our Fingers, the Husk will rise and shoot a little from it, then we draw off the Water and let it lie six, eight, ten or twelve hours to drain.

Now Barly bought about *Michaelmas* takes much less time in the Water, than afterwards when it has had the Sweat in the Mow. I suppose, because the Pores of its Skin or Kernel are more open, and which some wonder at after a dry Year when it hath little Rain in the Field and none in Swath, it imbibes the Water faster and is sooner steeped, than when it hath plenty

of

of Rain in the Growth, and some after it is cut before it be inned into the Barn.

Most experienced Maltsters judge it fit to give the Barly something too little rather than too much Water, because having imbibed too much, many Corns will smilt, or have their Pulp turn'd into a substance like thick Cream, which crushes out in stirring, others will have the Spirit drowned, and most of those which come without extraordinary pains will send forth their substance in an Acrospire.

The Barly being thus steeped enough and the Water well drain'd off, we throw it out upon the Couch-Floor; if the weather be immoderately warm we immediately Couch it about a Foot thick; but if we perceive it hath taken much water, or a hotter season require it, we spread it on the Floor much thinner; yet if the weather be moderately cold, we let it lie twelve hours on a heap, the Edges being only swept close up; after which, or a longer time in a Frost, we spread it in such a thickness as the weather and water it seems to have taken may require.

Thus laid it is stirred with the broad-casting Shovel usually thrice a day in moderate weather, but in cold only twice, and in hard Frost when the outsides of the Couch are apt to freeze (for the middle will never) I have known them couched up a Yard thick cover'd with an Hair-cloth and stirred only once a day, the Maltster being always careful to throw the frozen outsides into the middle till the Corn begin to fork and warm in the Couch; after which time if it be not laid too thin, it will not easily freeze.

Sometimes in the hot Months of *May, June,* &c. the Maltster will stir his Barley Couches till the Sprit begins to fork, five or six times a day or more; it being always his Care to keep them from drying too much on the outsides, lest they again be parched into Barley. But all his Care in Summer is sometimes too little, for the heat will so dry the Barley, that tho' it seem to come well, yet wanting moisture to put an Acrospire back, Malt proves but harsh and hard.

The Barley after it has been couched four or five days in cold Weather will sweat a little, and begin to shew the Chit or Sprit at the Root-end of the Corn. and in four or five days more (during which time it continues sweating, as is easily seen by stroking of the drier top of the Couch) it will be come long enough; but now except the Weather grow cold, it must still be laid thinner, and stirred three times a day or four; when the Come is long enough, at least in Summer, I have known it chit in 24 Hours after it had been thrown forth of the Cistern, and within three days come enough; the Maltster being forced to stir it six, seven or eight times a day, to keep it from running out, or the Sprit from coming too long: Sometimes I have known the Chit to peep before the Cistern was emptied in the heat of Summer, but this was only at the top of the Cistern; and in such a case it is the chief art of the Maltster to make the Barley Come even in the Couch.

It is a laborious time to the Maltster when Barley begins to grow in the Fields in the Spring, for that in the Couch by some kind of Sympathy will be so active; that it will require extraordinary much stirring to keep it from coming

coming too long, or emptying the pulp of the Corn in Sprits, which it is his care to prevent, not only lest it shrink the Corn in measure, which it will do something; but also lest it leave him only the Husk of the Corn instead of Malt.

When the Malt is come enough, we throw it thinner on the Floor to wither it, and stir it once or twice that day extraordinary. When it is once stopt with ordinary care and stirring, it will be kept from coming. The Corn is usually come enough when the Sprits are about half an Inch long, but in Summer let it come a little longer than in Winter to make the Malt rash. If it be come too much it will look rugged, and be apt to stick together, and when stirr'd it will fall uneven, or on heaps; then being stay'd from coming, we remove it into our upper Floors, where we keep it with stirring in hot Weather three, four or five times a day, to wither it as necessity requires.

One thing I must not omit, since many Malsters are ignorant of it; when the Sprits come forth at the Root-end of the Corn, another Sprit which we call the Acrospire begins to stir at the same end, and as the exterior Sprits run fast out, it moves slowly backward under the Skin unseen, and when they are come long enough, it is seldom gone further back than the middle of the Corn; but if the Malt afterwards be not cooled too hastily, or cast over thin on the withering Floor, this will run back to the end of the Corn, to which if it reach not, the part of the Corn which it passeth not, will remain unmalted, the rest will be perfect Malt. But if for want of stirring the Malt, or giving the Barley too

much Water in the Cistern, both which cause it, the Acrospire come out, it carries forth with it the heart of the Corn, and leaves little but Husk, especially if it get length, as before intimated.

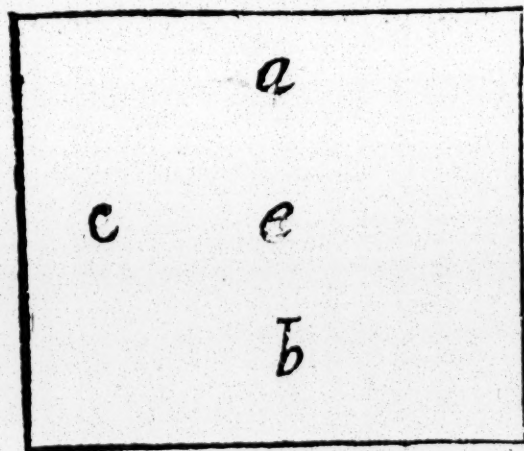
After the Malt has lain on the withering Floors about twelve or fourteen days, it will be fit for the Kiln, or sooner, if it begin to Acrospire; yet in sharp Frosts it will scarce be ready in three Weeks.

In Summer-time and hot Weather the Corns that are bruised by the Malsters Feet or Shovel in stirring, will be apt to mould, and the Malt if kept but a little too thick, or omitted when it ought to be stirred, will Acrospire; and if to prevent the Acrospiring it be thrown thin, many Corns will dry and parch into Barley again. Moreover in those that Come the Acrospire will scarce run back to the middle of the Corn, so that one half of it will be left Barley, which is the cause why the Summer made Malt brews ill, and is disliked by most of our Ale-brewers. The Malt made in the hot Weather of the Summer will not abide to lie above seven days on the Floor after it is come enough, before it be convey'd to the Kiln, by reason it is apt to contract Mould, which has a bitter Taste, and gives Drink an ill Relish; but when the Weather is cool in Summer as good Malt may be made as after *Michaelmas*

The Malt is laid on the Kiln to dry something thicker than it lay on the withering Floor, where when it has lain five Hours with constant Fire under it, the Maltster gives it the first Turn; about four Hours after, the second, and some three Hours after that the third. And if the Kiln dry well, in three Hours more with

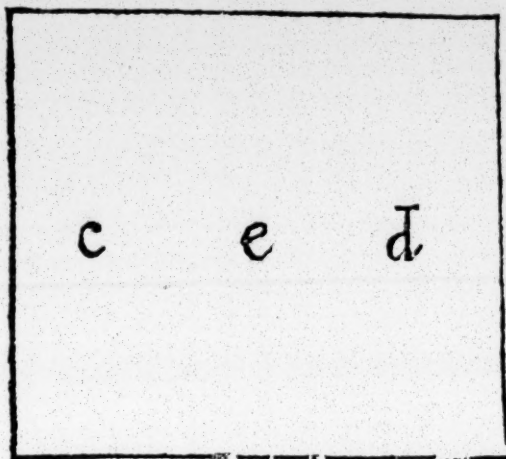
a moderate Fire (for fear of Fire-fanging) it will be dry'd enough. Thus it lies about fifteen Hours on the Kiln, sometimes more, and sometimes less, according to the goodness of the Kiln and greenness of the Malt, which if it be not well withered before it be laid on the Kiln will require a longer time to dry, and one turn on the Kiln extraordinary. But the Brick-kiln will dry a greater quantity in four, than we usually lay on one of the same Capacity of the common Make in twelve Hours. The ways of turning the Malt on the Kiln are various, the best esteemed, but troublesome, is thus.

Our Kilns being all of them four-square, we begin at any side, and with the broad Shovel cast up all the green Malt on it into two heaps in the opposite Corners, the driest next the Hair-cloth into the middle space betwixt them : As if we began at the middle *e*, we throw all



the green Malt into two heaps in the opposite side *a* and *b*, but the little dry next the Hair-Cloth betwixt 'em to *c*; then having sha-

ken up the Hair-Cloth so that no loose Corns may stick to it, and again laid it down very streight, we remove the green heaps to the opposite



posite sides
d c, as in
 this Figure
 but the lit-
 tle middle
 heap, with
 the dry
 under the
 other two,
 the shak-
 ings of
 the Cloth,
 after they

are removed to the space betwixt them *e*; then again composing the Hair-Cloth, we first cast down the two green heaps all over it of an uneven thickness, and the dry heap all over them, thus the greenest is turn'd to the bottom, and the dry lies on the top. Afterwards the Malster rakes it all over with a wooden Rake, to leave it every where of as even a thickness as possibly he can.

But the most usual, though not so much approved way is this; the Malster throws all the Malt on the Kiln on one close heap, in the middle of it, then shakes up his Hair-Cloth, which being laid down again very even, he casts the said heap abroad again round the Kiln, clearing the Hair-Cloth all that breadth where it lay, or something wider, which place he sweeps clean with a Broom, lest any Corns sticking to it, should be fire-fanged, then he fills up the said swept place with Malt cast into a round from the sides, and raking it very even, leaves it.

His Malt being dry'd enough, he removes it from the Kiln, and laying it above a Foot thick, treads

tread
 at th
 he h
 and
 calls
 Coun
 den
 bed
 he th
 be to
 he dr
 a Fa
 ter i
 Whe
 grou

Cha
 m
 M
 b
 S

M
 one
 Eart
 Row
 but
 T
 thra
 hath
 prov
 epua
 ly i
 lies

treads it round three or four times, beginning at the outsides, and winding himself round, till he hath trod up to the middle of the heap, and so back to the outsides again ; this he calls a Course, and in going two or three such Courses, his Malt, if well dried, will be trodden enough, that is, all the Come will be rubbed off ; then if the Malt be to be kept long, he throws it upon a heap in the Dust ; but if it be to be sold within two or three Months after, he dresseth the Dust from it by running it thro' a Fan or Frie, that so it may take the Air better in the heap, and become more mellow. When Malt is to be used, it is best to have it ground ten or twelve days before it be brewed.

Chap. IV. An Account of the manner of making Malt in Scotland, by Sir Robert Murray, according to the Method given by him in the Transactions of the Royal Society.

MALT is there made of no other Grain but Barley, whereof there are two kinds ; one which hath four Rows of Grain on the Earth, commonly called Big, and the other two Rows. The first is the more commonly used ; but the other makes the best Malt.

The more recently or sooner Barley hath been thrashed, it makes the better Malt. But if it hath been thrashed six Weeks or upward, it proves not good Malt unless it be kept in one equal temper ; whereof it easily fails, especially if it be kept against a Wall : For that which lies in the middle of the heap is freshest, that
which

which lies at the outsidés and at top is over dried, that which is next the Wall shoots forth, and that which is at the bottom rots. So that when it comes to be made into Malt, that which is spoiled does not come well (as they call it) that is, never gets that right mellow temper Malt ought to have, and so spoils all the rest. For thus some Grains come well, some not at all, some half, and some too much.

The best way to preserve thrashed Barley long in good temper, is not to separate the Chaff from it; but as long as it is unthrashed it is always good. Brewers use to keep their Barley in large Rooms on boarded Floors laid about one Foot in depth, and so turned over now and then with Scoops.

Barley that hath been over-heated in the Stack or Barns before it be separated from the Straw, will never prove good for Malt nor any other use. But though it heat a little after it is thrashed and kept in the Chaff, it will not be the worse, but rather the better for it; for then it will come the sooner and more equally.

A mixture of Barley that grew on several Grounds never proves good Malt, because it comes not equally. So that the best Barley to make Malt of is that which grows in one Field, and is kept and thrashed together.

Take then good Barley newly thrashed and well purged from the Chaff, and put thereof eight Boles, that is about six *English* Quarters, in a Stone-trough, where let it infuse, till the Water be of a bright reddish Colour; which will be about three days more or less according to the moistness and driness, smallness or bigness of the Grain, season of the Year, or temper

per of the Weather. In Summer Malt never makes well; in Winter it will need longer infusion than in the Spring or Autumn.

It may be known when steeped enough, by other Marks besides the Colour of the Water, as the excessive swelling of the Grain; or if over-steeped, by too much softness, being, when in the right temper, like that Barley which is prepared to make Broth of, or the Barley called by some *Urgewonder*.

When the Barley is sufficiently steeped, take it out of the Trough, and lay it in heaps, so let the Water drain from it; then after two or three Hours turn it over with a Scoop, and lay it in a new heap about twenty four Inches deep. This heap they call the Coming-heap, and in the managing of this heap aright lies the greatest skill. In this heap it will lie forty hours more or less, according to the fore-mentioned qualities of the Grain, &c. before it come to the right temper of Malt, which that it may do equally is most to be desired.

Whilst it lies in this heap, it is carefully to be looked unto, after the first fifteen or sixteen Hours. For about that time, the Grains will begin to put forth the Root, which when they have equally and fully done, the Malt must within an Hour after be turned over with a Scoop; otherwise the Grains will begin to put forth the Blade or Spire also: which by all means must be prevented: For hereby the Malt will be utterly spoiled, both as to pleasantness of taste and strength.

If all the Malt come not equally, because that which lies in the middle being warmest, will usually come first, turn it over, so as the
out-

outmost may lie inmost, and so leave it till all be come alike.

So soon as the Malt is sufficiently come, turn it over to a depth not exceeding five or six Inches, and by that time it is all spread out, begin and turn it over and over again three or four times. Afterwards turn it over in like manner once in four or five Hours, making the heap thicker by degrees, and continuing so to do constantly for the space of forty eight Hours at least.

This frequent turning of it over cools, dries and deads the Grain: Whereby it becomes mellow, melts easily in brewing, and separates entirely from the Husk.

Then throw up the Malt into a heap, as high as you can, where let it lie till it grows all as hot as your hand can endure it; which usually comes to pass in some thirty Hours space; this perfects the Sweetness and Mellowness of the Malt.

After the Malt is sufficiently heated, throw it abroad to cool, and turn it over again about six or eight Hours after, and then dry it upon the Kiln; where after one Fire, which must serve for twenty four Hours, give it another more slow Fire; if need be, a third. For if the Malt be not thoroughly dried, it cannot be well ground, neither will it dissolve well in brewing, and the Ale it makes will be red, bitter, and will not keep.

The best Fuel is Peat, the next Charcoal made of Pit-coal or Cinders; Heath, Broom and Furzes are naught. If there be not enough of one kind, burn the best first, for that gives the strongest Impression as to the Taste.

Chap. V. *Some farther Observations relating to Malt.*

SOME are of Opinion that the best and most natural way of drying Malt is in the Sun in the Months of *April* and *May*, especially for those that make but small Quantities for their own use, this making not only the palest but the most kindly, and wholsome of all others. The Drink made thereof hath a delicate Mildness, being of a warming exhilarating Quality, not so apt to heat the Body, nor send fumes into the Head. In all hot Seasons it may be done, every Man drying enough for his own use; also it may be done to great Advantage in hot Countries.

Some of late have cover'd their Kilns over with Wyer instead of Hair-Cloth, which is much the better way; for this doth not only dry it sooner, but cleaner and much sweeter; for by the means of this Grate, as it may be called, the properties of the Fire pass away more freely, and sweetning Vapours of the Air are not so much hindered from circulating, and therefore not so much Humidity contracted; but their Cloaths are thick, which prevents the fiery sulphurous Vapours from passing away, but are as it were beat back, and so do with great Violence seek their Centre whence they ceed; that is, re-enter the Fire; but finding no agreeable matter to incorporate with, they become more intense and raging, and so with a rapid Motion ascend, whereby the Heat that comes through the Cloth is still more stupefying, gross, sulphurous and hurtful to the Malt, as is most manifest by the Airs in all
close

close places, as where Stoves are, the Air having no free Circulation ; besides they are more cleanly and apt for the purposes, and the Malt will be whiter, and afford more lively and brisk Spirits.

In *Hertfordshire* they dry their Malt both with Wood and Straw so fine, that it shews finer than the Barley it was made of, giving both the same Colour and Taste to the Drink as the *Derbyshire* Malt ; I having near *Roxton* drank as good Ale brewed with it as any that either *Derby* or *Nottingham* affords, and of the same Flavour and Taste ; which they make so fine, as they tell me, by conveyeing of the Smoak from it, and by giving fifteen or sixteen Hours time to the Malt to dry on the Kiln ; whereas according to the common way they do not use to allow above four or five Hours, making good that old Saying, *That soft Fire makes sweet Malt* : But this sort of Malt is not so profitable as the other, being three or four Shillings in a Quarter dearer. And whereas the common Malt increaseth a Bushel in a Quarter, it's rare if forty Bushels of Barley at *Derby* produce forty Bushels of Malt. But I hope it will prove of advantage to improve our *English* Liquors, especially in our Southern Parts, where they have generally very bad Malt-drink.

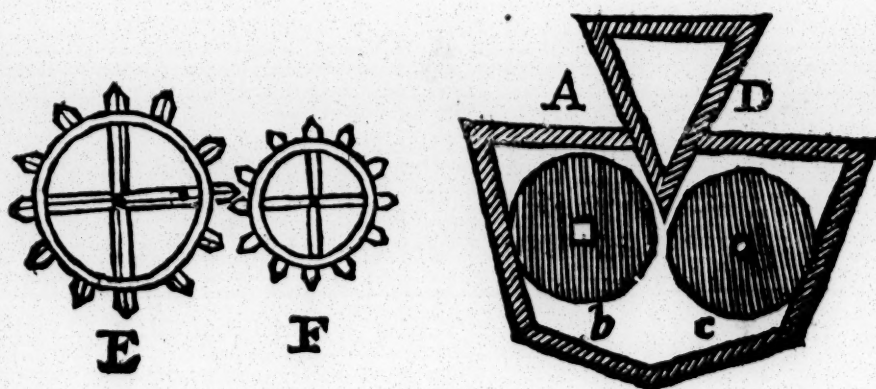
And though I have been very curious in getting some of the best sorts of both *Nottingham* and *Derby* Ales, I must say the best Ale that ever I drank was at *London*, which was brewed with half *Nottingham*, and half *Hertfordshire* Malt, made the common way. And is the best sort of Liquor if well brewed, and the Malt good : To try the goodness of which, put a
small

finall Quantity into a Glafs of Water, and what finks is good, but what fwims is naught.

Note alfo, that Wood cut five or fix Years, and laid up dry, is one of the beft Fuels to dry Malt with, provided you convey the Smoak from it.

I fhall farther, for the Conveniency of the Malt-Trade, add a particular fort of Mill that I think will be of good ufe for the grinding of it, and much more fubftantial and lafting than the common Mills, without being fo often out of order, and which I believe will grind a much greater Quantity than the common forts of Hand-mills do. I muft confefs, that all the Trial I had of it was with one that I made of Wood, not being able to procure a Workman in the Country who could make one of Iron; however that did fo well, that I can no way doubt the Performance of it in Iron.

It has this particular advantage, that it will not grind any of the Malt to Powder, but will squeeze or flat it only according to the diftance you fet your Rollers, which is a great advantage in brewing.



It is made after this manner: A is the Cafe
of the Mill, *b c* is the End of two Iron Rollers
VOL. I. A a that

that are about four Inches Diameter, and which may be a Foot and a half, or two Foot and half long, according as you will have it be turned by one or two Men: These Rollers must be set at such a distance from each other, as to break a single Grain of Malt, so much as you desire to have it broke. At D is a Hopper, the breadth of the bottom of which must be just half the length of a Barley-Corn, and near as long as the Rollers, that it may not feed them too fast. At one end of the Roller *b* must be put a Winch with the Wheel at E, and another smaller Wheel at F to be put on the Roller *c*, if you turn it but with one Man; but if you turn it with two Men, you may have only two Winches, one to each Roller, for one Man to turn against the other; only you must observe that one of the Men must not turn quite so fast as the other, because 'tis apt to make the Mill feed too fast.

Oats.

Oats are the best Grain for Horses, though in hot Countries where Oats do not thrive well, Barley is used for that purpose: But there is no Grain so wholesome for them as Oats are, and being malted like Barley, they make a pretty sort of Drink, especially if mixed with other Malt, as they do in many places in Kent, where they commonly brew with one half Oat-malt, and the other half Barley-malt. Besides, the usefulness of it for Bread-Cakes and Oat-meal, 'tis a Grain that Poultry love to feed on, and they are reckon'd to make them lay more Eggs than any other sort of Grain.

Pease.

The common use of Pulse is generally known as well for Man as Beast, but there are several that pretend to extract from them excellent Liquors, and to distil very good Spirits or
tain

Aqua Vitæ, without malting, as one (in a certain Tract publish'd by Mr. *Hartlib*) pretends that Rye, Oats, Pease and the like inferiour sort of Grain, handled as Barley until it sprout, it needing not for this Work to be dry'd, but beaten and moistned with its own Liquor, and soundly fermented, will yield a mighty increase. He also affirms, that out of one bushel of good Pease will come of Spirit at least two Gallons or more, which will be as strong as the strongest Anniseed-water usually sold in *London*. He afterwards in the same Tract gives a particular Process, which is thus:

Let Pease be taken and steeped in as much Water as will cover them, till they come and swell, and be order'd as Barley is for Malting, only with this difference, that for this Work if they sprout twice as much as Barley doth for Malting 'tis the better. The Pease thus sprouted, if beaten small, which is easily done, they being so tender, and put into a Vessel stoppt with a Bung and Rag as usual, they will ferment, and after three or four Months, if distilled, will really perform what is promised.

Thus, he also adds, may be made a Spirit or *Aqua Vitæ* out of any green growing thing, as Roots, Berries, Seeds, &c. which are not oily.

Also that the Spirit which is made out of Grain not dried into Malt, is more pleasant than the other.

'Tis not unlikely that Grain may afford its Tincture, and that excellent Beer and Ale may be made thereof without Malting, but I shall leave these things to experience.

 B O O K IX.

 Chap. I. *Of several sorts of Instruments,
Tools and Engines necessary for the Hus-
bandman's Use.*

THERE being several sorts and kinds of Instruments that are for the Husbandman's Use, without the Knowledge of which it will be impossible to go through the Difficulties of this Art ; as *Virgil* observes,

*The hardy Plowman's Tools we next must know,
Which wanting, we can neither Plow nor Sow.*

Amongst the Number of which are his Ploughs, Carts, Waggon, &c. and it being difficult and unprofitable to make use of such as are heavy, cumbersome and chargeable, when the same Work may as well be performed, if not better, with such as are easie, light, and not so costly, and with less Labour ; I shall endeavour to describe to you such as are the best and most proper for each particular sort of Work, according to such Method and Ways as have of late been discover'd to facilitate Work.

Ploughs.

For the Plough I have already given an account of that useful Instrument, and therefore shall now proceed to consider such other Instruments as are useful for the Farmers business, amongst which his Carts and Waggon may be esteemed some of the chief, most necessary and costly, of which there are several Sorts, and
for

for several Uses, as for Carriage of Timber, Corn, Dung, and such like; all differing the one from the other, according to the several places where they use them, and that the Countries are hilly, level, stony or clayie. In some places they are much more curious in the forming of them than in others, making them neater, lighter and slenderer, as well in the Wheels as in other Parts. And so for the form of the Wheels, some make them more Dishing, as they call it, than others, that is, more Concave, by setting of the Spoakes and Felloes more outwards, which they reckon the stronger, because the great stress of a Wheel is when a Cart or Waggon falls on one side into a hole, which occasions the Spoaks that are underneath by the declining of the Waggon to come to a Perpendicular. And the larger a Wheel is, the easier is the Draught, because the ring or round of the Wheel is more flat, and doth more easily pass over Stones, or other Obstructions in the way, and sinks not so easily into the Cavities or defective places of the Earth; its Motion is also slower at the Center, for a Wheel of eighteen Foot circumference goes but once round, where one of nine Foot must go twice, and so proportionably; the Advantage of which is confirmed by the Opinion of several.

Chap. II. *An Account of some Experiments which you have in the Transactions of the Royal Society, which, as they may be of use to the Curious, so may also serve for the improvement of our Carriages, and consequently both of Husbandry and Trade, which I shall give as inserted in the Transactions in the fifteenth Volume, p. 856.*

HAVING read in the Mechanicks of *Mersennus*, *Herigon* and *Dr. Wallis*, that the larger the Wheels of a Coach, &c. are, the more easily they may be drawn over a Stone or such like Obstacle that lies in their way, I was willing to try some Experiments, which I thought might convince some Men better of the Truth of it, than by a Mathematical Demonstration.

I therefore ordered a Model of a part of a Waggon to be made, consisting of four Wheels, two Axes, and a Board nailed upon the Axis. The lesser Wheels were four Inches and three quarters of an Inch, and the bigger Wheels five Inches and two thirds of an Inch high, &c. one twelfth part of the ordinary height of the Wheels of a Waggon, the weight of the Model was almost a pound and a half; I had also two other Wheels made that were five Inches and two thirds of an Inch high, to put on instead of the lesser Wheels. The middle of the two Axes were six Inches and a quarter asunder, all the Wheels turned very easily upon the Axes.

A piece of Lead of fifty Pound and three fourths Averdupois, was laid upon the Model

so

so forward, that the lesser Wheels seemed to bear above two third parts of the Weight. Then the Model was drawn with a string laid over a Pulley, the top whereof was one quarter of an Inch higher than the top of the hinder Axis, and the middle of the fore Axis.

The lesser Wheels being put on, and the string being tied to the top of this Pulley seven Inches and a half from the middle of the fore Axis.

1. Three Pounds drew the Model on the smooth level Table.

2. Twenty Pounds drew the lesser Wheels over a square Rod one quarter of an Inch thick.

3. Thirty Pounds drew them over a round Rod a little more than half an Inch thick.

4. Thirty one Pounds drew them over a square Rod half an Inch thick.

5. Twelve Pounds drew the hinder Wheels over the bigger square Rod.

The String being laid under the Axis, *viz.* Five eight parts of an Inch lower than before.

6. Twenty nine Pounds drew the lesser Wheels over the bigger square Rod.

Then the two bigger Wheels being put on instead of the lesser, and the String lying over the Axis.

7. Three Pounds drew the Model on the Table.

8. Twenty five Pounds drew the fore Wheels over the round Rod.

9. Twenty five Pounds drew them over the bigger square Rod.

10. The String lying under the Axis, sixteen Pounds drew them over the least Rod.

11. Twenty three Pounds drew them over the round Rod.

A a 4

12. Twenty

12. Twenty three Pounds drew them over the bigger square Rod.

13. Thirteen Pounds drew the hinder Wheels over the bigger square Rod.

All these Experiments were tried twice at least, and most of them three or four times over.

In all of them the Lead was laid exactly upon the same part of the Board, but yet when the lesser Wheels were taken off, the Lead did not lean so much forward, so that the hinder Wheels were somewhat more pressed than they were before.

Now by comparing the second, third and fourth Experiments, with the tenth, eleventh and twelfth, it appears how much more easily a Waggon, &c. might be drawn in rough Ways if the fore Wheels were as high as the hinder Wheels, and if the Thills were fixed under the Axis, such a Waggon as this would likewise be drawn more easily where the Wheels cut into Clay or Sand, or any soft Ground. And more over, high Wheels would not cut so deep as low Wheels, as Dr. *Wallis* doth plainly demonstrate, besides some other advantages which he mentions.

Indeed low Wheels are better for turning in a narrow compass than high ones: But it seems probable that Waggon with four high Wheels might be so contriv'd, that there should be no great inconvenience in that respect, at least for such Waggon as seldom have occasion to turn short, as Carriers Waggon and such like.

The difference which you may observe in the eighth and eleventh Experiments, which is agreeable to what is said by *S. Stevinus* and Dr. *Wallis*, viz. That if a Coach, &c. must be drawn

drawn over rough uneven places, 'tis best to fix the Traces of the Coach lower than the height of the Horses Shoulders. And therefore that is not the best way which some Waggoners use, who sometimes putting their Horses in Pairs, hook the Chain of some of the Horses to the Chest of the Waggon higher than they need to do.

14. A Table two Foot and a half long was set with one end eight Inches and a half higher than the other, and the Model being loaded as before, less weight by six Ounces drew it up the Table when the four bigger Wheels were on, than when the two bigger and the two lesser were on.

The reason of this is given by Dr. Wallis and other Writers of Mechanicks, viz. Because in the first Case there was almost the same direction of the motion of the Model, and of the string that drew it, but not in the second Case, when the fore Axis was so much lower than the top of the Pulley.

For the same Reasons 'tis that Carts having larger Wheels, are much easier drawn than Waggoners, but they have likewise another advantage, in having but one Axle-tree, for any thing drawn upon two Wheels is much easier than four, because of the double rubbing of the two Axle-trees, the rubbing of which is the main thing that occasions the Draught, else any thing drawn on Wheels would go as easie as on Ice, and because a small Axle-tree rubs less than a large, is the reason that Iron-Axle-trees, though much heavier, are better than those of Wood. In *Oxfordshire* they make their Carts with Iron Axle-trees, that are fixed in one Wheel, and turn in the other, which

which they say much eases the Draught. 'Tis certain, it eases the rubbing of one Wheel, but whether that may ease the whole Draught, I cannot determine, though I am apt to think it may. But though Carts are of much easier Draught in plain Countries, they are not so convenient for travelling, because when loaded in uneven Ways they bruse the Fill-horses Sides, and often indanger the breaking of their Backs.

Likewise the higher a Cart or Waggon is set, the more apt 'tis to overturn; and because the setting of it low, and the height of the Wheels after the usual manner of placing them cannot consist together, therefore it may prove very commodious to place the Bed of the Cart under the Axle-tree at such a distance as the depth or shallowness of the Ways or Waters you are to go through requires; for by this means part of the weight will be under the Axle-tree, which will so far counterpoise what is above it, that it will very much prevent the over-setting of both Carts and Waggon.

They are much more curious in making of their Carts and Waggon in *Holland* than we are, in that they make them very neat and high, so that one Horse will draw as much as two with our cumbersome heavy ones, but their Roads are good and even, which gives them a great advantage.

I shall not here mention any thing of the Sailing-Waggon, and several other Contrivances of that kind, till I find them brought to greater Perfection, only one ingenious Contrivance I have heard of, of a Gentleman in *Wales*, who having a Coal-pit near the Sea, from which to the Water-side is a plain descent all the way, he loads his Coals in Waggon,
for

for
or C
the
the
that
the

Cha

T
them
that
most
some
that

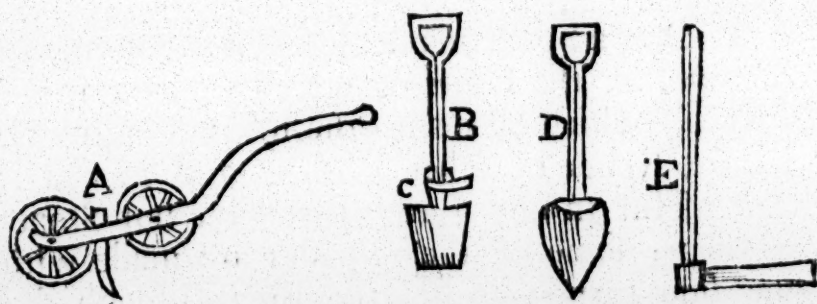


I f
or C
ful in
the f
is all
the t
it do
It ha
Butto

for the Wheels of which he hath made Grooves or Channels to run in, by which means, and the having of Sails for them, they tell me that the Wind carries them loaded to his Wharf, and that being unloaded one Horse draws them up the Hill again.

Chap. III. Of several Instruments used for Digging of Ground, &c.

There are several Instruments I need not describe, because the very naming of them will be sufficient; and therefore those that I shall describe, shall be only some of the most uncommon and most useful, or that have something peculiar from the common Sort, and that are only used in some particular Parts.



I shall begin first with the Trenching-Plough or Coulter, which is a certain Instrument useful in Meadows or Pasture-Ground, to cut out the sides of Trenches, Carriages or Drains, it is also useful to cut out the sides of Turf, for the taking of it up whole, to the intent to lay it down again in the same place or some other. It hath only a long Stale or Handle with a Button at the end for ones Hand, and at the other

other end it turns upward like the Foot of a Plough, to slide in the Ground, in which bend is placed a Coulter or Knife of the length you intend the depth of the Turf to be, the fashion of which you may see at A.

Several fashions there are of them, some with one Wheel, some with two, and some with none; you may make them as you please.

There are also many Sorts of *Spades* according to the diversity of places, and the several occasions and humours of Men.

At B is the shape of a Spade much used in *Essex*, the broad part of which is all Iron, the Handle going into a Socket at c, where is a piece of Iron to set the Foot on to dig with, which may be set on either side, according to the Foot the Occupier uses. This is one of the best Spades I have met with to dig hard lumpy Clays, but 'tis too small for light Garden Mould.

At D is a Spade made use of in the Fenns in *Lincolnshire*, the Edges of which are as sharp as a Knife, which makes it easie to cut Flag-roots, and the Roots of other Weeds, and indeed is very useful in any Lands that have not Stones in them; some of these Spades are made with one side turned up like the Breast-plough, by which means they with once jobbing into the Ground, can cut an exact Turf, so that one Man with one of these Spades in fenny soft Ground, will do as much in a day as two Men with a common Spade.

At E is a very convenient Instrument to dig hard Gravels, or stiff Clays, or chalky Lands with when hard. If you make one of these Instruments about sixteen Inches long, and four or five broad, making it every way strong in

Proper-

Prop
dle,
Clay
rise
whic
Tren
three
down
Beet
Han
Grou
it wi
far a
in ha
at or
have
two
begin
Cart
ling
do as
tocks
dred
mind
your
mean
Spad
use o
Be
other
Matt
Shov
mon
forts
mon,
fire
Wor
lishe

Proportion, into which put a long strong Handle, this Instrument is very useful to dig strong Clays with, especially in Summer, when it will rise in large hard lumps, the way of using of which is after this manner; first dig a small Trench ten or twelve Inches deep, and about three Foot from this Trench let a Man drive down the Instrument into the Ground with a Beetle, and let two Men, having hold of the Handle when the Iron part is drove into the Ground, raise up the end of the Handle, and it will raise the Earth up with it in lumps as far as the Trench that was first cut; sometimes in hard Grounds I have known as much raised at once as would near fill a Cart, when you have broke this part out you must remove it two or three Foot farther, and so on till you begin again, which lumps they fling into the Cart at once; this is a good way for the leveling of Land, one Man this way being able to do as much as two can with the Spades or Mattocks, but if you have room and are not hindered by Roots or Stones, &c. and have a mind to level a piece of Ground, break up your Land with the Plough first, and by that means you will save the Labour both of the Spade and Pick-ax, and be obliged only to the use of the Shovel.

Besides the forementioned, there are several other Instruments, as several kind of Hoes, Mattocks, Pick-axes, Grubbing-axes, Iron-croes, Shovels, Dung-forks, Paddles, which are common every where: but if there are any other sorts of Instruments any where that are not common, and that are not mentioned, I would desire them that are willing to promote this Work, to send an account of them to the Publisher.

Chap.

Chap. IV. Of several other Instruments necessary for the Farmer to have.

IT behoves the Husbandman that intends to thrive to furnish himself with all things necessary for his Business, that he may not put himself to the trouble of borrowing, nor the damage he may be likely to sustain for want of them, nor the scorn or disgrace of being deny'd any thing he wants, lest according to the old Saying it proves, that he that goes a borrowing goes a forrowing.

And that you may not be forgetful of any, or at least of the most useful and necessary Instruments, besides the forementioned, I will give you a List of Mr. *Worlidge's*, of such as are of common Use, and advise you to add such as you find deficient, and likewise to keep them in their proper places, which many times saves a great deal of trouble.

Things belonging to the Arable and Field Lands *To the Meadows and Pastures.*

Harrows,
Drags,
Sickles,
Reaping-hooks,
Weeding-hooks,
Pitch-forks,
Rakes,
Plough Staff and Beetle,
Sledges,
Roller,
Mole Spears and Traps

Cradle Scythes,
Seed-Lip,
Scythes,
Rakes,
Pitch-forks and Prongs,
Fetters, and Clogs, and
Shackles.
Cutting Spade for Hay-
Ricks.
Horse-locks.

<i>To the Barn and Stable.</i>	Wheel-barrows,
Flails,	Dibbles,
Ladders,	Hammer and Nails,
Winnow-fan,	Pincers,
Measures for Corn,	Scissors,
Sieves and Rudders.	Bridles and Saddles,
Brooms,	Nail-piercers or Gim-
Sacks,	lets.
Skeps or Scuttles,	Hedging-hooks and
Bins,	Bills.
Skrein for Corn,	Garden-shears,
Pails,	A Grind-stone,
Curry-combs,	Whet stones,
Mane-combs,	Hatchets and Axes,
Whips,	Saws,
Goads,	Beetle and Wedges,
Harness for Horses and	Leavers.
Yokes for Oxen,	Sheep-shears,
Pannels,	Trowels for House and
Wanteys,	Garden,
Pack-saddles,	Hod and Tray,
Surcingles,	Hog-yokes and Rings,
Cart-lines.	Marks for Beasts and
<i>Other necessary Instru-</i>	Utenfils,
<i>ments.</i>	Scales and Weights,
Hand-barrows,	An Awl, and every o-
	ther thing necessary.

B O O K X.

Chap. I. *Of Buildings, Repairs, &c.*

THE Farmer being often necessitated to build as well as to repair his Houses, Barns, Stables, &c. and that not only upon

upon the Account of decays, but of damages done by Storms and other Accidents I thought it might be of use to give him some short general Rules about Building and Repairs, and likewise of the Cost and Charges of Buildings, and of such Materials as are useful upon such Occasions, that he may the better compute his Cost and Charges himself, and not wholly trust to workmen to do it, (who often are very deceitful in such Calculations,) and know how to Let his Work to them, which is much the best way, where the Owner understands it; provided he minds one Caution, which is not to change or vary from his first Contract, which Workmen are very apt to perswade Men to do, if they have undertaken the Work at a low rate, or with design to engage them in Building.

Not that I shall here pretend to give a full account of all the particulars relating to Building and the several prices thereof, which would require a Volume of it self; but what I propose, is only so much as may give an insight unto those that understand any thing of common Arithmetick, to compute the ordinary prices of Building and Repairs by, and to instruct them in the most material Rules of Architecture, so far as it may fit them for their common Occasions, without committing those very gross Faults that many Builders run into.

I shall advise those that are desirous to build either out of necessity or choice, first to sit down and consider of the whole Design they intend to undertake, both as to the manner and method of it, as well as the charge and expence; Premeditation being a very necessary Preliminary to Building.

In

In order to which, I would perswade all Builders to take the Advice of such Surveyors or Workmen, as understand what they go about before they begin their Work, and that can make a good Draught, and lay the Design well out, that they advise to; that so when 'tis erected, it may in all things answer the End proposed, according to such Qualifications as may make it a compleat Structure, in order to which, it ought to be contriv'd so as to have Accommodation, Proportion, Uniformity and Strength, and to be durable and lasting, all which particulars, they that raise a new House are very much to blame in, if they do not take care of; for Method and Confusion are both of a price in this case, except only in that the latter may be dearest.

Now in Building, we ought to consider five Particulars, its Situation, Contrivance, Gracefulness, Usefulness and Beauty.

The Rules for Situation are, that it stand in a healthy Air, and not near Marshes, Fenns or boggy Grounds, nor Rivers, except it stand on rising Ground on the North or West side of them; neither let it be destitute of Breezes to fan and purge the Air, nor want the influence of the Sun-beams, according to *Rapin's* advice;

*If on thy native Soil thou dost prepare
T' erect a Villa, thou must place it there
Where a free Prospect does it self extend
Into a Garden, where the Sun may lend
His influence from the East; his radiant heat
Should on your House thro' various Windows beat:
But on that side which chiefly open lies (arise,
To the North-wind, whence Storms and Show'rs
VOL. I. B b There*

*There plant a Wood, for without that defence,
Nothing resists the Northern violence.*

And *Cato* saith, that a Country House should have a good Air, and not be open to Tempests, and be seated in a good Soil, &c. But I shall advise the planting of shelter on the West and South West, as well as the North; and that you take care also, that it be well water'd and wooded, that it have a good ascent to it, which makes a House wholesome, and gives opportunity for good Cellaridge, and likewise a good Prospect is very pleasant according to the variety it affords.

Contrivance.

As for the Contrivance, which is a thing of great moment in Building, I would perswade every one that begins this Work, to be well advised in what he doth, because there will be no alteration of things afterwards without a great deal of charge; and good Contrivance doth not only make things handsome and convenient, but often saves a great deal of charges too; and therefore get a Work-man that is able to make a good Draught of your Building, as I said before, if your Building is such, as requires no great curiosity; but if it doth, a Model will be the most certain way of preventing mistakes in Buildings that require any great Nicety or Exactness; and as for a Draught, there ought to be in it the Ichnography of each Floor, and also the Orthography of each Face of the Building, as of the Front, Rear and Flanks; and if the Workman be skilled in Perspective, more than one Face may be represented in one Diagram Scenographically.

But in the Contrivance of all these things, the Quality of the Person is to be consider'd for

for whom the Building is erected, and accordingly let every thing be design'd, and proportionable lengths, breadths and height allowed to each place, with proper and convenient Rooms for what occasions and uses the Owner shall need; only what Draught you make, let it be as large as you can, that so the Ich-nography of all Chimneys, Hearths, Jambs, Bed-places, Stairs, and the Latitude of all Doors and Windows in each Floor may be represented; and if you agree by the great for the Workmanship, it will be necessary to insert the length and thickness of the Ground-plates, Breast-summers, Girders, Trimmers, Joysfs, Raifings, and Wall-plates; and also the thickness of the Walls, Partitions, &c.

In the Orthographical Schemes there should be a true delineation, and the just dimensions of each Face, and of what things belong to it, as Doors, Windows, Balconies, Turrets, Chimney Shafts, *Facias*, Architraves, Cornices, and other Ornaments; and if it be a Timber Building, the several sizes of the Ground-plates, Interduces, Breast-summers, Beams, principal Port-braces, Quarters, Window-posts, Door-posts, Cellar-beams, principal Rafters, &c. This care will prevent mistakes and disputes that may arise, especially where you agree by the great.

Having given these Caveats, I shall next proceed to consider the disposal of the several Rooms and Offices, according to the nature of the Building you design to erect.

In Building of Houses long, the use of some Rooms will be lost, in that the more room must be allowed for Entries and Passages, and it requires the more Doors; and if a Building

Sorts of Houses.

consist of a Geometrical square, if the House be large, the middle Rooms will want Light, and therefore many commend the form of the Roman Capital H, which form they say, makes it stand the firmer against the Winds, and lets in both the Light and the Air, and disposes every Room near to one another, except you will have a Court in the middle, which was the method of Building of great Houses formerly; but for small Houses I think the Square the best form.

I must here commend the way of Building of Brick Houses with strong and firm Quoins or Columns at each corner, and where any of the principal Beams lie that shall come out half their thickness beyond the rest of the Brick-work, by which means the rest of the Walls between may be much thinner, and a great many Bricks saved; and besides, it adds a handsome Gracefulness to the building: Brick-walls likewise built after the same manner in Panels, are very handsome, and save a great many Materials.

But according to Sir *H. Wotton's* definition of Building, it consists of these two Heads or Principles, *Gracefulness* and *Usefulness*.

Gracefulness.

The Gracefulness or Decency of a Building, he says, consists in two things. *First*, An Analogy or Correspondency between the Parts and the Whole, whereby a great Fabrick should have great apartments, great Lights, great Doors, great Stair-cases, and great Pillars or Pilasters, all which ought to be proportioned to the bulk of the whole Building. And *Secondly*, an Analogy and Agreement between the Parts themselves, as to the Length, Breadth, and Height of the Rooms, Windows and Doors, for all which no certain

certain Rule can be given. Though some propose, that a Room ought to be in breadth two thirds of the length, and that it should be as high as broad, and the height of a square Room to be two thirds of it's square; but as to these things you must be govern'd by the bulk, and the design of the whole Building, as I said before.

Besides which, the heights of Rooms are various amongst us, according to the Persons they are built for; our ordinary Building being but about seven and a half or eight Foot high, the second sort of Houses in the Country are about nine Foot, and the third sort, which is fittest for Gentlemens Houses, is from ten to fourteen Foot.

As for Sir *Henry's* second Point of Usefulness, the Person, and the occasion he hath for his Rooms are to be consider'd: but to determine what number of Rooms must be allowed to a Nobleman's Seat, will require too many considerations to be inserted here; yet for an ordinary Gentleman's Family, a Hall, a great Parlour, with a Withdrawing Room by it, and a smaller Parlour for common Use, with a Kitchen, Butteries and other Conveniences, is sufficient; and underneath where there is a descent that drains may be made, I am for having of good Cellars and the Dairy; but for the Kitchen in the Country, where there is room enough, I think it better to join it to the House, than either to have it in or underneath it, because of the smells (especially in hot weather) that it sends into the House: and as for the Farm-houses, I think one large Room with a large Chimney in it, to do the chief of their Work in, with a good Parlour, a good Dairy, with

B b 3

good

good conveniences of Butteries, Cellars, and Out-houses, enough for a Farmer ; which several Rooms should be bigger or smaller according to the bigness of the Farm that belongs to it.

To which Observations, I shall add some general Maxims for Contrivance in Building, as follows.

1. Let not common Rooms be private, as Halls, Galleries, Stair cases, &c. and let not private Rooms lie open and common, as private Parlours, Chambers, Closets, &c.

2. Light also is a principal Beauty in Building, and the Rooms that respect each particular Coast, ought as near as you can to be accommodated to it, as those Rooms next the South for Winter Rooms, and those that regard the East for Summer Rooms; the North Windows are best for Cellars, Butteries, &c. Rooms that have thorough Lights for Entertainment, and those that have Windows on one side for Dormitories.

3. As for the size of your House, you had better build it too little, than too big, for a large House brings Company and Entertainment, occasions the keeping of a great many Servants, and often requires a larger Purse than is laid up for it.

4. As to the strength of a Building ; Country Houses ought to be substantial, and able to encounter all the shocks of the Wind, and not to be above three Stories high, including the Garrets ; and observe in working up the Walls, that no side of the House nor any part of the Walls be wrought up three Foot above the other before the next adjoining Wall be wrought up to it, that so they may be all join'd together

and

and make a good Bond, or else what is done first will be dry, so that when they come to settle, one part being moist and the other dry, it will occasion it's settling more in one place than another, which causes cracks and settlings in the Wall, and much weakens the Buildings. The Materials also ought to be substantial, and be sure if you build a Brick-building to take care of a good Foundation, and not be scanty in allowing good Mortar, taking care that all your Brick-work be covered with the Tiling, according to the new way of Building, without Gable-ends, which are very heavy, and very apt to let the Water into the Brick-work; the want of observing of which three things is the common decay of Brick Buildings.

5. Upon a good Foundation two Bricks of eighteen Inches thick for the heading Course is sufficient for the Ground-work of any common Structure, and six or seven Courses above the Earth to the Water table, where the thickness of the Walls are abated, or taken in on either side the thickness of a Brick, which is two Inches and a Quarter.

6. But for large high Houses of three, four or five Stories high, the Walls of such Edifices ought to be from the Foundation to the first Water-table, three heading Course of Brick, or twenty eight Inches thick at the least, and at every Story a Water-table, or taking in on the inside for the Summers Girders or Joys to rest upon, laid into the Middle or one fourth part of the Wall at least, for the better Bond; but as for the Innermost or Partition-walls, a Brick and a half will be enough, and for the upper Stories nine Inches (or a Brick in length) Wall will be sufficient.

Beauty.

The *Beauty* of a Building consists much in a regular Form and a graceful Entrance, for Regularity and Proportion pleaseth the Eye; and I think a fair well wrought Front of Brick, pleasanter than one of Stone, which soon looseseth its Colour and turns black. The being let through a double Grove of Trees to a House and to have fine Walks and Gardens behind, and on as many sides of it as you can, is very ornamental.

And let your Offices, Barns, Stables, &c. neither join to, nor be too near your House, especially your Stable, which ought always to be a Building by it self, because of the Danger of Fire, upon the Account of the looking after Horses, and the Use of Candles in it.

To which Maxims, I shall add some general Rules to be observed in Building, as order'd by Act of Parliament for the Building of *London*.

General Rules.

1. In every Foundation within the Ground, add one Brick in thickness to the thickness of the Wall, next above the Foundation, to be set off in three Courses equally on both sides.

2. That no Timber be laid within twelve Inches of the fore-side of the Chimney-Jambs, and that all Joynts on the back of any Chimney be laid with a Trimmer six Inches distant from the back.

3. That no Timber be laid within the Funnel of any Chimney, upon penalty to the Workmen for every Default ten Shillings, and ten Shillings a Week for every Week it continues unreformed.

4. That no Joynt or Rafters be laid at greater Distances from one another, than twelve Inches,

Inches, and no Quarters at greater Distance than fourteen Inches.

5. That no Joynt bear at larger lengths than ten Foot, and no single Rafters at more in length than nine Foot.

6. That all Roofs, Window-frames, and Cellar-floors be of Oak.

7. That the Tile-pins be of Oak.

8. That no Summers or Girders do lie less than ten Inches into the Wall, nor Joynt than eight Inches, to be laid in Loam, because Mortar is apt to rot all Timber, and therefore some Workmen pitch the End of such Timbers as they lay in Walls.

9. That no Summers or Girders do lie over the Head of Doors or Windows.

10. That good Oak Timber be laid over Doors and Windows, and that good Arches be turned over them.

Where a House is set upon moist Ground, *Of Foundations.* dig the Earth two Foot deep, and after beating of it well, lay a Bed of Mortar, or Cement from either side to the Channel, and then lay a Bed of Cinders upon the Mortar, beat it well, and cover it with another Cement of Lime, Sand and Ashes, this will drink up the Moisture and make it dry. But if the Earth you build on be very soft, as in Moorish-ground, then you must get good pieces of Oak, whose length must be the breadth of the Trench, or about two Foot longer than the breadth of the Wall; these must be laid cross the Foundation about two Foot asunder, and being well rammed down, lay long Planks upon them, which Planks need not lie so broad as the pieces are long, but only about four Inches of a side wider than the Basis or Foot of the Wall, and to be

be well pinned or spiked down to the pieces of Oak, on which they lie; but if the Ground is so very bad that this will not do, you must provide good Piles of Oak, of such a length as will reach the good Ground, and whose Diameter must be about one twelfth Part of their Length, which must be well drove down with an Engine, and then lay long Planks upon them, spiking or pinning of them down fast.

But if the Earth is only faulty in some places and good in others, you may turn Arches over those loose places, which will discharge them of the weight. Note also, that you must place your Pile not only under your Out-walls, but under your Partition-walls too, that divide the Building, for if they sink, it will crack and damage the Outer-walls too.

And that you may know the proper Sizes of Timber for your ordinary Buildings; I shall, to what hath been said already, add a Scheme of the Proportion of Timber, as agreed to by Act of Parliament for rebuilding of the City, that your Timber may in strength be answerable to the rest of your Building.

A S C H E M E of the Proportions of Timber for ordinary Buildings.

	F.	F.	In.	In.	F.	In.	In.
Summers of Girders from	$\left\{ \begin{array}{l} 14 \\ 18 \\ 20 \text{ to } 23 \\ 23 \\ 26 \end{array} \right\}$	$\left\{ \begin{array}{l} 16 \\ 20 \\ 23 \\ 26 \\ 28 \end{array} \right\}$	In leng. must be in their Square	$\left\{ \begin{array}{l} 11 \\ 13 \\ 14 \text{ \& } 10 \\ 16 \\ 17 \end{array} \right\}$	$\left\{ \begin{array}{l} 8 \\ 9 \\ 10 \end{array} \right\}$	Foyfts of	$\left\{ \begin{array}{l} 11\frac{1}{2} \\ 10\frac{1}{2} \end{array} \right\}$
						In leng. must be in their Square	$\left\{ \begin{array}{l} 8 \\ 7 \text{ \& } 3 \\ 6 \end{array} \right\}$
Binding Foyfts, & Trimming from	$\left\{ \begin{array}{l} F. \\ 7 \text{ to } 11\frac{1}{2} \end{array} \right\}$	$\left\{ \begin{array}{l} F. \\ 7 \text{ to } 11\frac{1}{2} \end{array} \right\}$	In leng. must be in their Square	$\left\{ \begin{array}{l} 6 \\ 7 \text{ \& } 5 \\ 8 \end{array} \right\}$	5	Wall-plates and Beams of any lengt. from 15 Foot may have in their Square	$\left\{ \begin{array}{l} In. \\ 7 \\ 10 \text{ \& } 6 \\ 8 \end{array} \right\}$
							$\left\{ \begin{array}{l} In. \\ 5 \\ 6 \end{array} \right\}$
Purlynes from	$\left\{ \begin{array}{l} F. \\ 15 \text{ to } 18\frac{1}{2} \\ 18\frac{1}{2} \end{array} \right\}$	$\left\{ \begin{array}{l} F. \\ 18\frac{1}{2} \\ 21\frac{1}{2} \end{array} \right\}$	In length must have in their Square	$\left\{ \begin{array}{l} 9 \\ 12 \end{array} \right\}$	8	and	$\left\{ \begin{array}{l} 8 \\ 9 \end{array} \right\}$
Single Rafter Principal Rafter in length from $6\frac{1}{2}$ to $9\frac{1}{2}$	$\left\{ \begin{array}{l} F. \\ 12\frac{1}{2} \\ 14\frac{1}{2} \\ 18\frac{1}{2} \text{ to } 21\frac{1}{2} \\ 21\frac{1}{2} \\ 24\frac{1}{2} \end{array} \right\}$	$\left\{ \begin{array}{l} F. \\ 14\frac{1}{2} \\ 18\frac{1}{2} \\ 21\frac{1}{2} \\ 24\frac{1}{2} \\ 26\frac{1}{2} \end{array} \right\}$	In length must have in their Square on one side	$\left\{ \begin{array}{l} In. \\ 8 \\ 9 \\ 10 \text{ to } 8 \\ 12 \\ 9 \end{array} \right\}$	$\left\{ \begin{array}{l} In. \\ 5 \\ 7 \\ 8 \\ 9 \end{array} \right\}$	On the other side	$\left\{ \begin{array}{l} 6 \\ 7 \\ 8 \\ 8 \\ 9 \end{array} \right\}$
	$\left\{ \begin{array}{l} 6\frac{1}{2} \\ 0 \\ 9\frac{1}{2} \end{array} \right\}$	$\left\{ \begin{array}{l} 6-3\frac{1}{2} \\ \text{and} \\ 5-4 \end{array} \right\}$	Principal Dischargers of any leng. from	$\left\{ \begin{array}{l} F. 10 \text{ upwards} \\ \text{Must have in their Square} \end{array} \right\}$	$\left\{ \begin{array}{l} In. \\ 13-12 \\ 16-13 \end{array} \right\}$		$\left\{ \begin{array}{l} In. \\ 13-12 \\ 16-13 \end{array} \right\}$

Having given you general Directions and Cautions about Buildings: I shall in the next place, give you some general Rules about the valuing of Buildings, and the Materials belonging to them, that you may know how to make some estimate of things of this Nature, without being wholly imposed upon by Workmen, who are in these Cases very apt to abuse whosoever they have to do with, as I said before.

*Carpenters
Work.*

Carpenter's Work is measured by the Square, that is ten Foot each way, or one hundred square Feet; at *London* they will build a House four Story high for forty Pounds a Square, if built with Oak-Timber, and thirty Pound a Square for Fir; that is, to find all the Materials, and all the Carpenters, Brick-layers, Plaisterers and Glasiers Work; and considering the Price of Timber, and Workmanship in the Country, and that the Houses are but three Stories high, and that they have all their Materials laid in, that is, carted for them, I cannot think, but a good House may be built for twenty five Pound a Square in most places, and in some, cheaper.

The Carpenter's Work to frame a House in the Country, where you find Timber, is seven or eight Shillings a Square, if the Carpenter pays the Sawing; if not, 'tis four Shillings and Six-pence a Square.

The Carpenter's Work to build a Barn in the Country that hath one single Stud, or one heighth of Studs to the Roof, is two Shillings a Foot, but if it have a double Stud and a Girt, 'tis worth two Shillings and Six-pence; that is to measure one side and one end; as suppose, a Barn sixty Foot long, and twenty Foot broad,
that

that is, eighty Foot ; this, the Carpenter's Work to hew the Timber, saw it out, frame it and set it together, will come to, at two Shillings and Six-pence a Foot, ten Pound, you finding of the Timber.

Bricklayers Work at London, where a Bricklayer hath two Shillings and Six-pence a Day, a Labourer twenty Pence, and that Bricks are fourteen Shillings a Thousand, Lime Fourpence half-penny a Bushel, and Tiles two Shillings and Six-pence a hundred ; for the Bricklayer to find Bricks, Mortar, Scaffolding, &c. for a House, is five Pound a Pole-square, that is, sixteen Foot and a half ; but for Walling, four Pound ten Shillings a Pole, if the Bricklayer finds all Materials, is enough ; but for his Work only, 'tis one Pound two Shillings a Pole, that is two hundred seventy two square Feet, and a Brick and a half thick ; in the Country they will build a Wall for eighteen Shillings a Pole, supposing the Wall to be a Brick and a half thick.

The Bricklayers Work is measured by the Pole-square, that is deducting out all Windows and Doors in the Wall ; but if you are to measure a Wall, as suppose of one hundred and twenty Foot long, and thirteen Foot three Inches high, you must multiply the one by the other, and it will make 1590 Foot, which divide by 272 $\frac{1}{2}$ makes five Poles, or Rods, three fourths and forty two Feet ; but if 'tis more or less than a Brick and a half thick, you must reduce it to a Brick and a half by multiplying the length, and the height by the Number of half Bricks that the Wall is in thickness ; dividing the Product by three, and the Quotient by 272 $\frac{1}{2}$. Chimneys are commonly done by the Hearth.

Hearth. And note, that one Brick and a half thick is fourteen Inches, two Bricks is one foot and a half, and that four thousand five hundred of Bricks will do a Pole-square of Walling one Brick and a half thick, and twenty five Bushels of Lime where the Sand is good, that is, where 'tis of a large rough Grain, and not mixed with Soil.

Tiling.

Tiling is measured by the ten Foot-square, the Workmanship of which is three Shillings and Six-pence a square in the Country, to find all but Tiles is twelve Shillings, and to find Tiles and other Materials is one Pound six Shillings a square. Three Bushels of Lime will do a square of Tiling, but I prefer Loam and Horse-dung mixed together, and laid about the middle of the Tile, so as not to touch the Pins or Laths, nor to be so near the point as to wash out, because Lime is too corroding, being apt to make the Tiles scale, and to grow with Moss.

Slates are a fine light Covering for Houses, and in *Northamptonshire* are ordered thus: They dig the Stone about *Michaelmas*, and pile it up in Stacks, which they cover with Sand till the Frost comes, and then they take them down and lay each Stone flat on the Ground, and sprinkle Water on them, always keeping of them moist: For should they let the Stones lie exposed to the Sun and Wind, they would not cleave. A piece of flat Stone two Inches thick, will run perhaps into twenty Slats, according to the Clefts made by the Frosts, which the frequenter they are, the clearer and finer the Stones cleave.

Under-

Underpinning for the Bricklayer to dig the Foundation where 'tis a Brick thick, and a foot deep, is a Penny a foot, and where 'tis two foot and a half running Measure, 'tis Two-pence a foot, and so proportionable.

Bricks may be made of any Earth that is clear *Bricks.* of Stones, even Sea-owse, but all Earth will not burn red. To burn a Clamp of Brick of sixteen thousand, they commonly allow seven Ton of Coals, twenty hundred to a Ton, or nine hundred of Faggots of about three foot long, and to some Earth, ten Bushels of Coals to a thousand of Bricks. Bricks ought to be nine Inches long, four Inches and a half broad, and two Inches and a half thick; a Yard square of Clay will make seven or eight hundred of Bricks, and the Workmen have commonly six Shillings a thousand to make them.

The Plasterers Work is commonly done by *Plasterers.* the Yard square for Lathing; Laying and Setting is Eight-pence a Yard, rendring on a Brick-wall is Three-pence a Yard, stopping and whitening one Penny Half-penny a Yard, whitening a Penny a Yard; but Lathing, Laying and Setting with Oak-Laths is ten or twelve Pence a Yard.

To daub a Partition-wall with Clay on both sides is Three-pence a Yard, and to rough cast it without, and render it on the inside Four-pence a Yard in the Country.

Heart-Laths of Oak are one Shilling and Ten-pence a Bundle or Hundred.

Sap-Laths of Oak are one Shilling and Eight-pence a Bundle:

Fir-Laths are Twelve-pence a Bundle.

Laths of five Foot long are an hundred in a Bundle; of four Foot long one hundred and twenty;

twenty; and from half an Inch to an Inch and half thick of each sort but the Fir-Laths.

A Bundle of Laths they reckon will do a Square of Tiling, and five hundred of Nails.

Sawing of Timber is from two Shillings and Eight-pence to three Shillings a Hundred, which they measure in the middle of the Tree, and suppose a Board to be ten Foot long, and one broad, once cut is reckoned so many Foot.

Thatching.

Thatching with Straw is done from two Shillings and Six-pence to three Shillings a Square, and with Reed for four Shillings a Square: Two good load of Straw will do about five Square, the Square being a hundred square Feet; and a thousand of Reed will cover three Square of Roofing, which costs about fifteen or sixteen Shillings, both which Thatchers most commonly tie on with Withs, but old pitched Ropes unwound are much cheaper, and more lasting to tie them with.

Digging.

Cellars, Foundations of Buildings, &c. are commonly done by the Yard solid, which contains twenty seven square Feet, which is usually counted a Load; and therefore the Dimensions being given in Feet, Multiply the length by the breadth, and the Product by the depth, dividing the last Product by twenty seven, the Quotient will give the Content in solid Yards.

Glasiers Work is done by the Foot-square, *English* Glas is Six-pence a Foot, *French* Glas one Shilling, and Crown Glas one Shilling Six-pence a Foot; to take down a Quarry of Glas to scowre, fodder, band, and to set it up again, is three Half-pence a Foot.

In the Country to find six Foot Pale, Post, Rails, Nails and Workmanship, is fourteen Shillings a Pole; a five foot Pale is twelve Shillings

lings a Pole, and a four foot Pale is ten Shillings a Pole.

Cleft Pales are worth eleven Shillings a hundred, 120 Pales of four foot long making a hundred; 100 of five foot, and 80 of six Foot long to the hundred.

Posts hewed ready for four foot Pales are worth twelve Shillings a Post; for five foot, eighteen Shillings.

Rails by the Pair of nine foot long are eighteen Shillings a Pair; and of ten foot, twenty Shillings.

Timber of about twelve Inches girt is best for Pales or Laths. A Ton or forty foot of good clear Timber, that will cleave well, will make about three hundred of five foot Pales; and forty eight of four foot.

But a Ton of Timber will make about 440 foot of an Inch Board, which, if cut into fit lengths, will make 80 five foot Poles, 100 four foot, and 133 three foot, each a foot broad, which in paling will reach three times as far as the like Number of Cleft Pales.

To cleave Pales is 12 *d.* the hundred.

The space between Lath and Lath should be three Inches; 7 or 800 of Tiles, 100 of Laths, and 500 of Nails will do a square of Tyling; and a load of Straw will do about a square of Thatching.

Chap. II. *Of Mills.*

IN Ancient Times they bruised their Corn in Mortars, since which tedious way Mills have been invented, some to be turn'd by Hands, as Querns, others to be moved by Horses, others by Wind, and others by Water; which last being maintained with least Cost, and being most certain and most advantageous, hath gained the Preheminence, and is made use of in most places where Water is fit for that purpose, and where there is Employment. Which although 'tis a little for the ease and conveniency of near Inhabitants, and for the particular Advantage of the Owner; yet 'tis a very great Detriment and Damage to the Kingdom in general, by the injurious obstructing of the Water, to the spoiling of a great deal of Meadow-ground, and by the preventing of the advantage that might be made by overflowing of Land, which upon the Removal of the Mills might be done, and the Corn as well ground either by Windmills, which grind twice the Quantity in an Hour, and may be erected on Hills, or in the Plains on any open Places, even where the Water-mills stood. Or by the Rectification of Water-mills, that a less Quantity of Water might serve them; to which end many have made very ingenious Attempts, and without question, much might be done in it, both in the framing and ordering the Water-works, and in the Contrivance of the Mill it self, which doubtless goes much heavier by the Stone,

Stone, they call the Runner, its being so large, and being encompassed with a Hoop or Case that keeps the Meal to the edge or circumference of the Stone, and much deadens its Motion: For the larger the Runner is, the heavier it moves, which may in some Measure be remedied, by making four or five Vents or Passages in several Places of the Hoop, to take off the Meal as fast as it is ground, that none may lie to clog the Runner.

Or a Mill may probably be so contriv'd, that the Grinding stone or Runner may be vertical, and of but a small Circumference, the flat and square edge whereof may be fitted into another fixed Stone cut hollow about the half or Third-part of a Circle, which Runner by its first Motion may dispatch as much Corn in the same time as a larger the other way. Several also of these vertical Stones may be placed on the same Axis, and may be used in all sorts of Mills.

But considering the Ill-name of the Millers (which I wish they did not so much deserve) and the Reasons before given, I believe Hand-mills would be of much more advantage both to publick and private Families, one of which sort for the grinding of Malt I have given you already; and I could wish that others of the same kind for other sorts of Corn might be found out, or those sorts which are already found out more improved, and be made more lasting than they are.

Chap. III. *Of several Sorts of Works belonging to Husbandry, computed according to the Workmens Wages of Fourteenpence a Day in Summer, and Twelvecpence a Day in Winter.*

*Plowing
and Har-
rowing.*

OF *Plowing and Harrowing.* A Man cannot well plow in stiff Grounds above an Acre in a Day of Lays or Land the first time 'tis fallowed, but where Land is broke up already, if the Land is not miry, he may plow an Acre and half, and in sandy light Lands two Acres. In stiff Clays they may plow and sow one Acre of Wheat, and an Acre and a half of Barley or Oats, and in light Lands double as much with one Team of Horses; but an Ox Team cannot do above Two-thirds of that Quantity.

The Price for plowing of Land is five Shillings an Acre, and one Shilling an Acre for harrowing; but if 'tis Land not plowed before, 'tis worth seven Shillings an Acre. The Charges of keeping an ordinary Team of Horses, where Oats sell for ten Shillings a Quarter, and Hay at twenty Shillings a Load, the Countrey-men reckon about fifty Pounds a Year.

*Of Reap-
ing and
Mowing.*

Of Reaping and Mowing of Corn. A Man with a Binder may reap an Acre of Wheat, and something more of Rye in a Day, if it stands well; or one Man alone may reap and bind half an Acre; and of Pease, Vetches, &c. one Acre: For making up of Sheafs of Oats or Barley, one Man will bind as much as another can mow, and that from two to four Acres in a Day, if thin.

The

The Price of Reaping and Binding of Wheat by the Acre is two Shillings; of Rye Twenty-pence; to mow Oats is one Shilling an Acre, and to make them fit to Inn is one Shilling an Acre more; to do the same for Barley is worth one Shilling and Three-pence an Acre.

Of Thrashing of Corn. A Man may thrash ^{Thrashing.} four Bushels of Wheat or Rye, six Bushels of Barley or Oats, and five Bushels of Beans and Pease in a Day, if the Corn thrash well.

The Price of Thrashing of Corn is, for ^{Price.} Wheat, from Three-pence to Four pence a Bushel; for Rye from Two-pence to Three-pence; for Oats from Fourteen-pence to Sixteen-pence a Quarter and for Barly the same.

Of Digging of Land. A Man may dig four or five square Pole in a Day of Garden-ground, a Spit deep, that hath been dug already; and he may dig three Pole or more to fill into Wheel-barrows, and something better than two Poles into Carts, if 'tis good digging Ground.

The common Price for digging of Garden-ground is Four-pence a Pole, because they expect better Wages for Garden, than other Work, else Three-pence a Pole is good Wages. To dig Ground a Spit deep, and to fill it into Wheel-barrows is worth Four-pence a Pole and into Carts Six-pence a Pole.

Of Hedging and Ditching. A Man may Ditch and Quick-set three Poles or more in a day, where the Ditch is three Foot wide, and two Foot deep.

A Man may make a Hedge five Foot high, bind it well, and lay it thick, and do two Pole in a day; if lower, he may do double.

The Price of Hedging and Ditching, to make a Hedge and lay the Quick is Three-pence a Pole.

To make a Hedge and cleanse a Ditch, the common way is Five-pence, a Pole; but if he plash it well, and cleanse the Ditch two Spit deep, and sets it with Quick where any is wanting, 'tis worth from Six-pence to Eight-pence a Pole.

To lay a Hedge and bind it well, and to make a new Ditch of three Foot wide, and two Foot deep is Twelve-pence a Pole.

To make a new Ditch three Spit or two Foot deep, and three Foot-broad, is Twelve-pence a Pole, and in very stony Ground, Fourteen-pence a Pole, and the Workmen find Quick and plant it and make a new Hedge with Bulthes.

Of making of Banks. They are measured by the Float or Floor, which is eighteen Foot square, and one deep, which contains twelve Cart-load in good Mould. A Man will fill into Wheel-barrows a Floor and a half in a Day, which will require three Men to carry away in Barrows, and to trim and ram the Earth.

Note, that of what depth and breadth you make your Ditch, the Bank will be near of the same height and breadth.

In the Marshes they dig a Ditch ten Foot wide at the top, and six in the bottom, and four Foot deep, at two Shillings a Pole, reckoning twenty one Foot to the Pole.

To measure a Ditch, take the length, and for the breadth see how wide 'tis at the bottom and at the top, and half it; as suppose a Ditch six Foot wide at the top, and four at the bottom,

tom, which makes ten Foot, the half of which will be five Foot, which multiply by the length, and you have the Contents of the Ditch.

To mow Grass. A Man may mow in a day an Acre of Meadow ; but if it stand well and be even, he may mow an Acre, or an Acre and a half ; and if 'tis Up-land Meadows, and the Grass thin, he may mow two Acres in a day.

To cut Grass, and to make it Hay fit to carry in, is worth in Meadows five Shillings an Acre, and in Up-lands from three Shillings and Six-pence to four Shillings an Acre.

Chap. IV. *Of the Charges and Profit of Farming.*

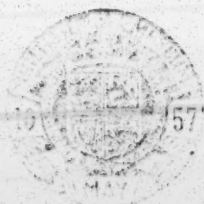
THEY commonly allow a Farm to make three Rents, one for the Landlord, one for Charges, and one for the Tenant to live on ; but 'tis but few Farms that will constantly afford that Increase, or be maintained for that Charge ; indeed, if you take a Farm of 100*l.* *per An.* if the Land is worth 20*s.* an Acre, 100*l.* may defray the Charges of it : but if the Land of a Farm of 100*l.* a Year, is worth but 10*s.* an Acre, you must allow 120 or 130*l. per An.* for Charges and you must reckon 250 Acres of such Land to 100*l.* a Year, or you will lose by it, unless 'tis very improveable Land.

But there being great Variety of Lands, and particular Charges that attend some Lands more than others, which will require the Farmer's utmost Care, Diligence and good Husbandry, and which would take up more room to particularize, than I have to do it in ; I shall rather

refer him to proportion things as near as he can, according to Mr. Tuffer's Directions, as he hath summed up the Charges of Farming, with which I shall conclude this Part of Husbandry.

1. One part cast forth for Rent due out of hand,
 2. One other part for Seed to sow thy Land;
 3. Another part leave Parson for his Tythe,
 4. Another part for Harveſt, Sickle and Scythe.
 5. One part for Plow wright, Cart-wright, Knacker and Smith.
 6. One part to uphold thy Teams that draw there-with;
 7. Another part for Servants, and Workmens Wages lay.
 8. One part likewise for fill Belly day by day:
 9. One part thy Wife for needful things doth crave,
 10. Thy Self and thy Children the last part would have.
-

The End of the Firſt Volume.



A

T A B L E

T O T H E

First V O L U M E.

A <i>Alder</i> pag. 7 <i>Anniseed</i> 203 <i>Ants</i> 328 <i>Apiary</i> 266 <i>Arable Land</i> 43 <i>Ashes their Use</i> 120 <i>Asses</i> 223		<i>Barley the use of</i> 333
		<i>Barren Springs</i> 20
		<i>Beans</i> 139
		<i>Beans to keep</i> 149
		<i>Beasts</i> 204
		<i>Bees</i> 266
		<i>Black Mould to order</i> 75
		<i>Black Oats</i> 134
B <i>Badgers</i> 315 <i>Bark of Trees</i> 122 <i>Barley several sorts</i> 130 <i>Barley to keep</i> 151		<i>Black Thorn</i> 5
		<i>Blites to prevent</i> 305
		<i>Boggy Lands to improve</i> 21
		<i>Breast-plough</i> 80
		<i>Bricks</i> 382
		<i>Brick Earth</i> 72
		<i>Bricklayers Work</i> 381
		<i>Broom to destroy</i> 309
		<i>Buck</i>

The T A B L E.

Buck Wheat or Brank 136

Building and Repairs 367

Bulfinches 323

Bull 227

Burning Land 79

C

Calves to manage 229

Carlick 312

Carpenters Work 380

Carts and Waggon 358

Caroway Seed 202

Carrots 201

Catterpillars to destroy 327

Cattle to feed 232

Chaffinches 323

Chalk the use thereof 83

Chalky Land to manure 68

Clay 99

Clay Lands to order 67

Clover 32

Cold in a Horse 214

Colts to breed 205

Coriander Seed 202

Corn Lands to order 66

Corn to preserve 141

Cows and Oxen 228

Crab-stocks 3

D

Digging of Foundations 384

Dogs 253

Draining Land 22

Ducks 258

Dungs to order 124

Dung of several sorts 113

Dyers Dung 122

E

Of Earth 102

Fullers Earth 98

Elder Tree 7

Esparet 43

Eyes sore to cure 221

Blow on the Eye 222

F

Fallowing Land 52

Farcy 221

Fenny Land 22

Fern 310

Feeding Cattle 232

Fish-Ponds 291

Fish-Shells 107

Flax 154

St. Foin

The T A B L E:

<i>St. Foin or Holy-bay</i>	37	<i>Granaries</i>	141
<i>Foddering of Cattle</i>	333	<i>Gravel Ground</i>	69
<i>Fowls</i>	255	<i>Gravelled Horse</i>	223
<i>Fowls Dung</i>	118	<i>Gripes</i>	218
<i>Foxes</i>	313		
<i>French Barley</i>	131	H	
<i>Frogs</i>	323		
<i>Signs of Fruitfulness and</i>		<i>Hares</i>	316
<i>Unfruitfulness of Land</i>		<i>Hair of Beasts</i>	122
	64	<i>Harrowing Dung</i>	16
<i>Fullers Earth</i>	98	<i>Hay to make</i>	29
<i>Furze to destroy</i>	7, 309	<i>Heathy Land</i>	74
<i>French Furze</i>	200	<i>Heats and Droughts to</i>	
		<i>remedy</i>	297
G		<i>Hedges to plash</i>	3, 10
<i>Gaining Land from the</i>		<i>Hedges to plant</i>	8
<i>Sea</i>	26	<i>Hemp</i>	152
<i>Gargle to cure</i>	251	<i>High Winds Remedies</i>	
<i>Garlick</i>	312	<i>against</i>	302
<i>Geese</i>	256	<i>Hogs</i>	247
<i>Glanders to cure</i>	221	<i>Hogs Dung</i>	116
<i>Glasiers Work</i>	384	<i>Holly Tree</i>	5
<i>Gnats and Flies</i>	326	<i>Hops</i>	170
<i>Goats</i>	245	<i>Hops by a Kentish Gen-</i>	
<i>Goldfinches</i>	323	<i>tleman</i>	188
<i>Goose Dung</i>	119	<i>Hop Clover</i>	41
<i>Goose Grass</i>	312	<i>Horses and Mares</i>	204
<i>Grease to carry off in a</i>		<i>Horse Beans</i>	139
<i>Horse</i>	219	<i>Horse Dung</i>	113
		<i>Humane Ordure</i>	118
			<i>Jays</i>

The T A B L E.

I

<i>Jays</i>	321
<i>Inclosing of Land</i>	I
<i>Instruments of Husbandry</i>	366

K

<i>Kites</i>	320
--------------	-----

L

<i>Lands to order</i>	67
<i>Land overflowed by Sea-breaches</i>	28
<i>La Lucerne</i>	39
<i>Lay to plough</i>	51
<i>Lentils</i>	140
<i>Lice</i>	328
<i>Lime</i>	84
<i>Lime-stone</i>	123
<i>Liquorice</i>	166
<i>Ling and Heath</i>	310

M

<i>Madder</i>	160
<i>Malt</i>	333
<i>Malt at Derby</i>	339
<i>Malt-dust</i>	122

<i>Mallender to cure</i>	221
<i>Manuring of Land</i>	78
<i>Marle</i>	87
<i>Marsh Land</i>	16
<i>Sea Marshes</i>	26
<i>Peat Marle</i>	87
<i>Cowshot Marle</i>	89
<i>Slate Marle</i>	87
<i>Measels in Hogs</i>	252
<i>Mice and Rats</i>	319
<i>Mildews</i>	363
<i>Mills to grind Malt</i>	353
<i>Moles</i>	316
<i>Moorish Land</i>	75
<i>Mules</i>	224
<i>Musty Corn to cure</i>	151
<i>Murrain to cure</i>	217
<i>Murrain in Oxen</i>	236

N

<i>Natural Produce of several sorts of Soils</i>	64
--	----

O

<i>Oates</i>	354
<i>Oates to keep</i>	150
<i>Ordure Humane</i>	118
<i>Ore Weed</i>	106
<i>Otters</i>	215
<i>Overflowing of Land</i>	17
<i>Oxen</i>	

The T A B L E.

221	Oxen	231		
78	Oyster-weed	19		R
87				
16	P			
26	Parsly	42	Rabbits	252, 316
87	Pasture Land or Meadow		Rags	121
89		14	Rape or Cole Seed	155
87	Peacocks	265	Rey Grass	40
252	Pease	137	Laying Land in Ridges	57
319	Pease to keep	150	La Romain	42
363	Pease the use of them	354	Rushes to destroy	311
t 353	Pheasants	265	Rot Sheep	242
316	Pigeons	261, 321	Rye to order	125
75	Plague or Murrain	217,	Rye to keep	149
224		236		
151	Plaislerers Work	383		S
217	Ploughs of several sorts			
236		44, 356	Saffron	167
	Plowing of several sorts		Safflow	169
	of Land	51	Salt Springs	123
	Plough-trenching	49	Sandy Land	69
	Breast-plough	80	Sand, Land improved by	
f seve-	Polecats	316	it	100
64	Pomegranates	196	Sea Omse	106
	Preserving of Corn	141	Sea Shells	107
	Things prejudicial to the		Season to sow Corn in	59
354	Husbandman	297	Sea breaches	28
150	Purge for Horse	211	Servise Tree	38
118			Sheep	239
106	Q.		Sheeps Dung	115
315			Shrubs to pull up	308
d 17	Quick to plant	8	Silk Worms	286
Oxen				Slinking

The TABLE.

<i>Slinking of Foal to prevent</i>	222	<i>Black Thorn</i>	5
<i>Smuttiness of Corn to prevent</i>	129, 305	<i>Thorn to draw out</i>	222
<i>Snails</i>	324	<i>Thrashing and cleaning of Corn</i>	151
<i>Snail-cod</i>	106	<i>Trefoil</i>	41
<i>Soap-ashes</i>	121	<i>Trenching-plough</i>	363
<i>Several sorts of Sails</i>	64	<i>Trenches to carry Water</i>	19
<i>Soot</i>	121	<i>Trough used in Essex</i>	25
<i>Sowre Land to order</i>	76	<i>Turkeys</i>	259
<i>Sowing of Corn</i>	59	<i>Turneps</i>	131, 157
<i>Sparrows</i>	323	<i>Twitch-grass</i>	312
<i>Barren Springs</i>	20	<i>Tyling</i>	382
<i>Spurry Seed</i>	42		
<i>Staggers to cure</i>	219		
<i>Steeping of Corn</i>	61		
<i>Stone-Fences</i>	3		
<i>Stony Land</i>	71		
<i>Stones their Inconveniencies</i>	307		
<i>Swine</i>	247		

T

<i>Tanners Hair</i>	122
<i>Tan-pits</i>	123
<i>Tares</i>	140
<i>Teasels</i>	202
<i>Thatching</i>	384
<i>Things prejudicial to the Husbandman</i>	297
<i>Thistles</i>	311
<i>White Thorn</i>	3

V

<i>Vetches</i>	139
<i>Uplands</i>	15
<i>Urine good for Land</i>	117
<i>Urry</i>	123

W

<i>Wasps and Hornets</i>	326
<i>Weld or Dyers Weed</i>	165
<i>Wheat</i>	127
<i>Wheat to keep</i>	149
<i>Wheat its Use</i>	332
<i>White Oats</i>	135
<i>Wild Oats</i>	313
<i>Woad</i>	163
<i>Worms to kill</i>	325
<i>Worm in the Tail</i>	237
<i>A Computation of the Husbandman's Work</i>	388



BOOKS Printed for and Sold by G. Mortlock
at the Phoenix in St. Paul's Church yard.

THE Works of the Right Reverend
and most Learned Prelate Dr. *Ed-
ward Stillingfleet*, late Lord Bishop of
Worcester. In Six Vols. Folio.

*Clementis Alexandrini Operaq; Extant.
Recognita & Illustrata. Per Joannem Pot-
terum Episcopum Oxon.* 2 Tom. Fol.

The Antiquities of *Nottinghamshire*, ex-
tracted out of Records, Original Evidences,
Leiger-Books, and other Manuscripts and
Authentick Authority. Beautified with
Maps, Prospects and Pourtraictures. By
Robert Thornton, Dr. of Physick, Fol.

*Stillingfleet's Origines Sacrae: Or, A Rati-
onal Account of the Grounds of Natural
and Reveal'd Religion, the 8th Edit.* Fol.

Fifty Sermons preach'd upon several
Occasions. By *Edward Stillingfleet*, late
Lord Bishop of *Worcester*, Fol.

The Happy Ascetick: Or, Best Exercise,
together with Prayers suitable to each
Exercise. To which is added, a Letter to
a Person of Quality concerning the Holy
Lives of the Primitive Christians. By
Anthony Horneck, D. D. The Fifth Edi-
tion, Corrected.

The New-Years-Gift, Compleat. In Six
Parts. Composed of Prayers, Meditations
for the Sacrament, Lent, and other Oc-
casions.

BOOKS Printed for and Sold by R. Robinson at
the Golden Lion in St. Paul's Church-yard.

Expository Notes with Practical Observations
on the New Testament. By *William Bur-*
kit, M. A. The Sixth Edition.

The History of the Apostles Creed, with
Critical Observations on its several Articles.
The Third Edition, 8vo.

An Enquiry into the Constitution, Disci-
pline, Unity and Worship of the Primitive
Church, that flourish'd within the first 300
Years after Christ. Faithfully Collected out
of the extant Writings of those Ages. By an
Impartial Hand.

The Christian's Defence against the Fears of
Death. Written in *French* by the late Reverend
Divine *Ch. Drelincourt*. Translated into *English*
By *Marius D' Assigny*, B. D. The 8th Edition.

Religious and Christian Advice to a Daugh-
ter. Written by a Lady.

A Compendious History of the Rise and
Progress of the Reformation of the Church
here in *England*, from Popish Darkness and
Superstition. Together with an Account of
Non-Conformity, and the Grounds thereof,
since the said Reformation: Also *K. Charles II's*
Declaration about Religion, 1660. To which
is added, A brief Account of Cathedral Wor-
ship, with the Rise and Antiquity thereof. By
a Gentleman.

Boyer's Royal French and English Dictionary.

An Abridgment of Mr. *Baxter's* History of
his Life and Times: With an Account of the
Ministers who were after the Restoration:
With the Grounds of their Non-Conformity;
their Treatment in the Reigns of King *Charles*
and King *James*, and after the Revolution;
and the Continuation of their History to the
passing of their Bill against Occasional Confor-
mity in 1711. The Second Edition, in Two
Volumes. By *Edmund Calamy*, D. D.

son at
yard.
vations
m Bur-

with
rticles.

Disci-
mitive
ft 300
ed out
By an

ears of
verend
English
tion.
Daugh-

se and
Church
fs and
unt of
hereof,
les II's
which
Wor-
f. By

onary
ory of
of the
ation
mity;
Charles
ution;
to the
onfor-
Two